

VOL. XXX. No. 1

JANUARY 1945

MECCANO

MAGAZINE



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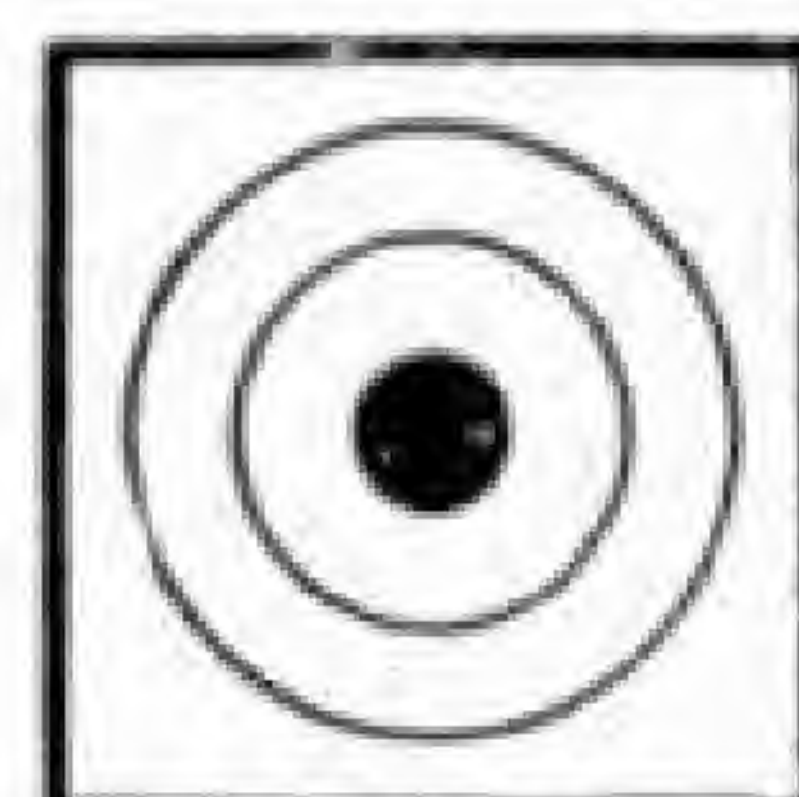
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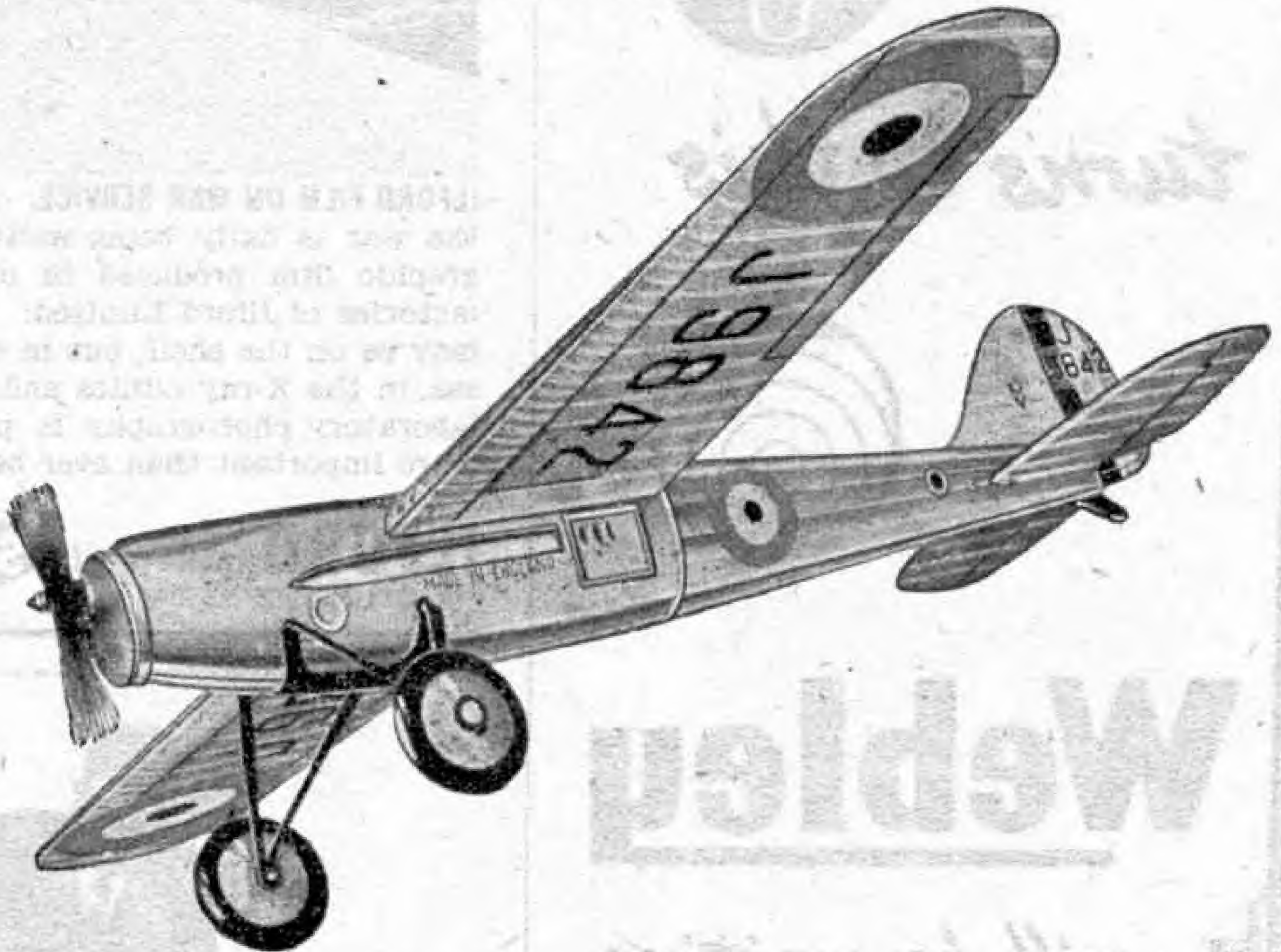
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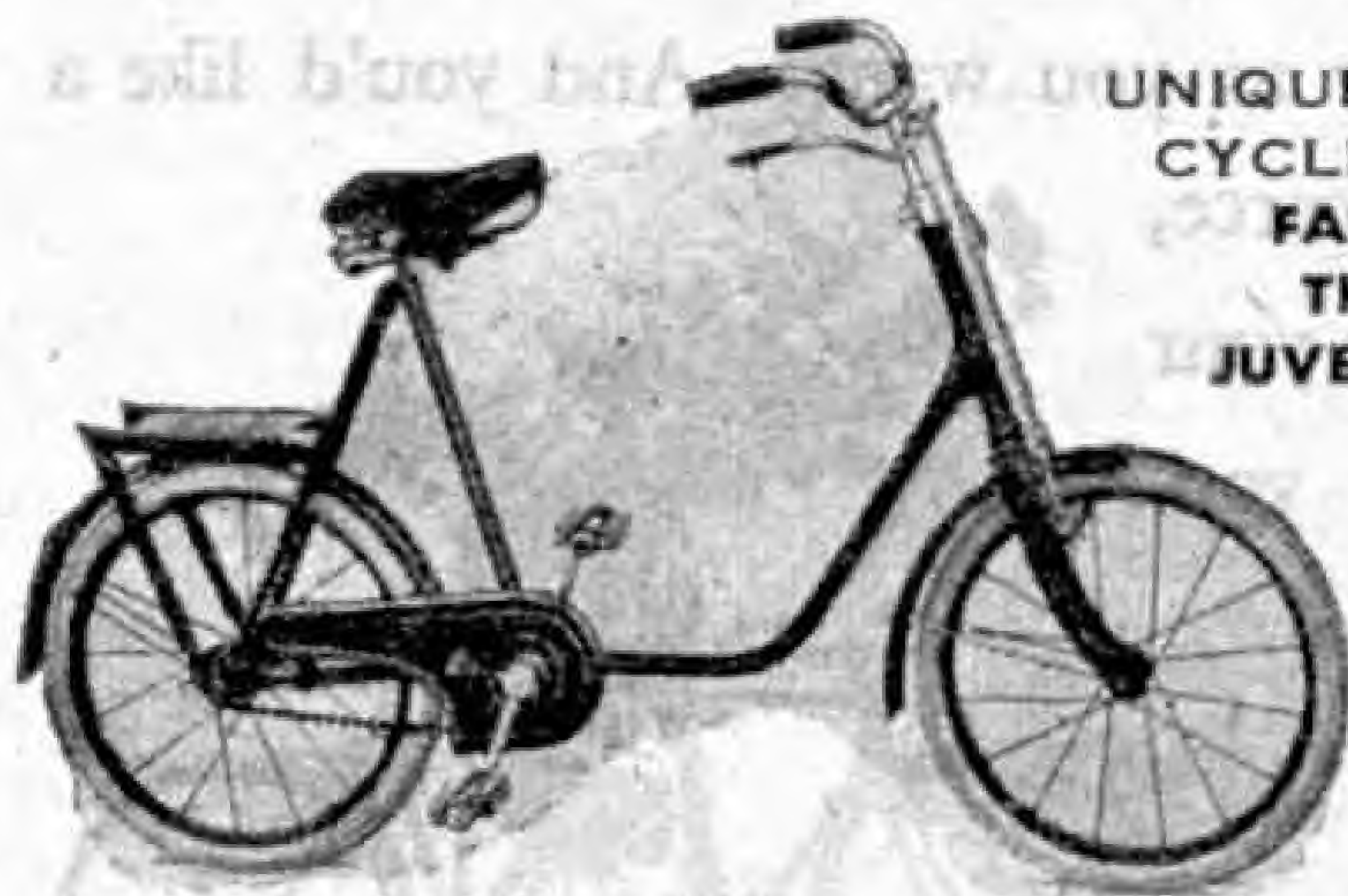
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MECCANO

MAGAZINE

Editorial Office:
Binns Road
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Vol. XXX

No. 1

January 1945

With the Editor

The Last Winter of War with Germany

A year ago on this page I prophesied that 1944 would be the year of victory over Germany. My prophecy has proved rather too optimistic, largely on account of our splendid troops having to encounter an enemy against which they could do nothing—the weather. From D Day up to the present time the weather has been almost consistently against us, to the great advantage of the Hun. In particular our Air Force has been prevented from exerting its full striking power in support of the troops.

As I write, the Germans have launched a great counter-attack against the American First Army. Such an attack was bound to come. This will be thrown back. Possibly it may lengthen the war by a short period, but it cannot affect the result. Victory is certain and within sight.

Road-Building for War

Engineering has played an enormous part in the field in this war in a great variety of ways, but none has been more important than the development of methods of road-building at high speed.

The bulldozer, which a few years ago seemed so essentially fitted for peaceful land operations, has been transported to many fighting fronts in Africa, Italy, France and the Far East. Soon it will be playing its part in the advance into the heart of Germany. It may be described as a machine for pushing earth away from places where it is not wanted, and for pushing it to and spreading it over places where it is urgently needed. It thus prepares the way for the road-builder.

The announcement that bulldozers have put in an appearance on any front indicates that the road-builders will soon be at work

on a large scale. But road-building in war areas is very different from the leisurely process with which we were so familiar in times of peace. The really vital factor is speed, and to attain this entirely new methods of construction have had to be thought out and perfected. One notable result has been the development of what may be called the portable road, consisting of sections of track produced in advance on an immense scale, transported to the required place, and laid down with almost incredible speed. One of the most interesting articles in this month's issue describes the Sommerfeld track that has been of such great value to the Allied Forces, not only in making roads, but also in laying down with astonishing rapidity flight strips and even fair-sized airfields.

In later articles I hope to describe other triumphs of the wartime engineer in his efforts to help the troops in the field.

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The World's Most Beautiful Capital

RIO DE JANEIRO, the capital of Brazil, is a busy city of nearly 2,000,000 people, but to most of us it is perhaps best known because of the amazing beauty of its surroundings. It is spread along the south shore of a wonderful bay stretching inland from the sea for 16 miles and having a coast line of more than 60 miles. The bay has an entrance less than a mile in width, and is protected from the open Atlantic by a rocky tongue of land that ends in the

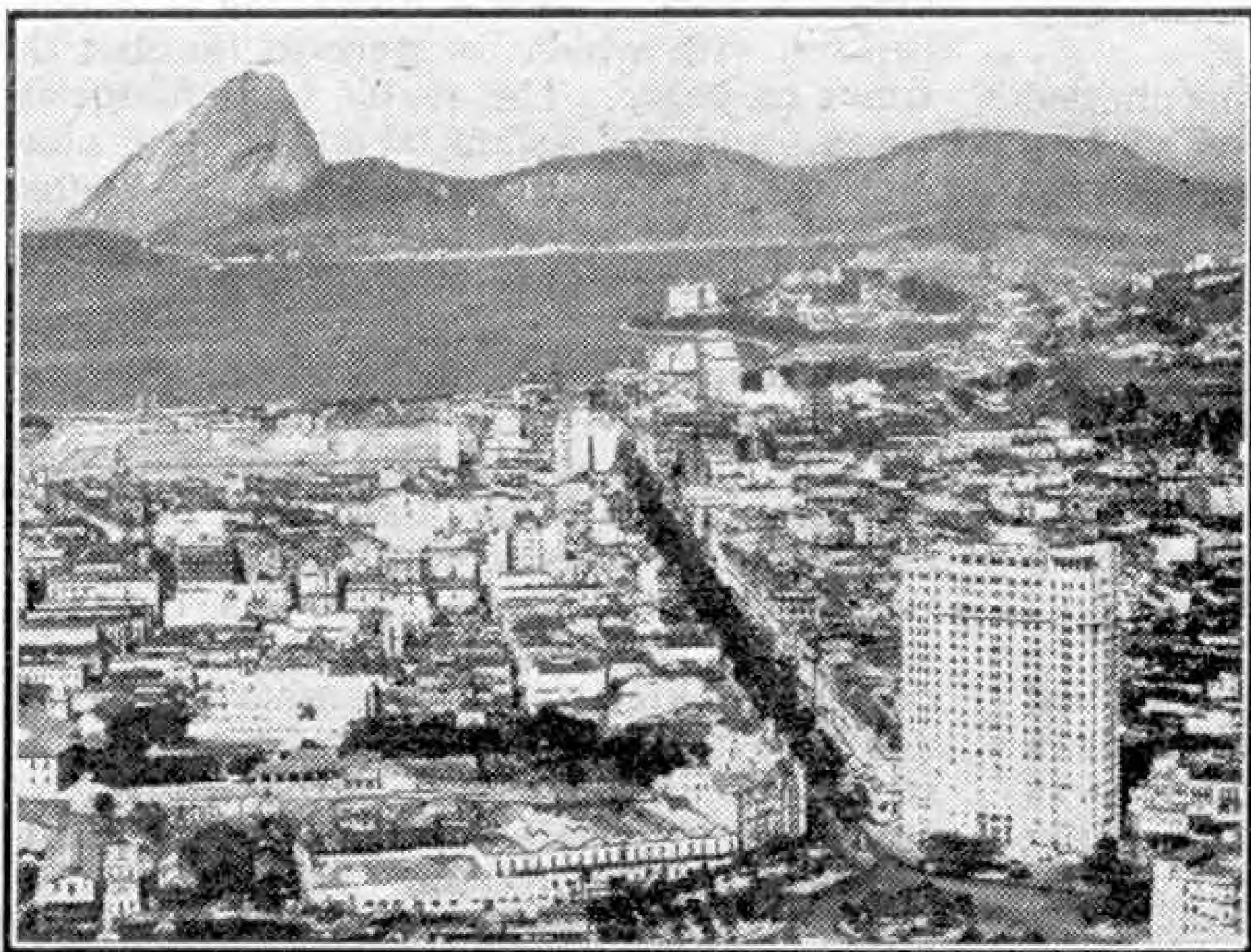
coast of South America. More Portuguese followed him, this time by intent, but it was not until 31 years later that the bay on which the city of Rio de Janeiro now stands was discovered by an explorer named Martim Afonso de Souza. When he entered the bay, sailing through the narrow opening guarded by the majestic Sugar Loaf, de Souza thought that he was entering a great river; and as the month was January he decided to give this the name Rio de Janeiro, which

simply means River of January. It was soon discovered that the so-called river was a magnificent bay hidden from the sea by mountains and known to the Indians as Nitherohi, or hidden water, and the position proved so congenial in every way that in the centuries that followed it grew to be the site of the greatest city in Brazil.

The mountains that help so much to make Rio de Janeiro attractive also cut it off from the interior of the country. One result of their presence is that the city has stretched in a line along the spaces between the mountain and the bay instead of spreading outward in roughly semi-circular form, as so many

cities on the coasts of seas and lakes have done. In spite of the handicap that the presence of mountains imposes, there would be none willing to part with these, and the combination of mountain, beach and sea undoubtedly makes Rio de Janeiro unique.

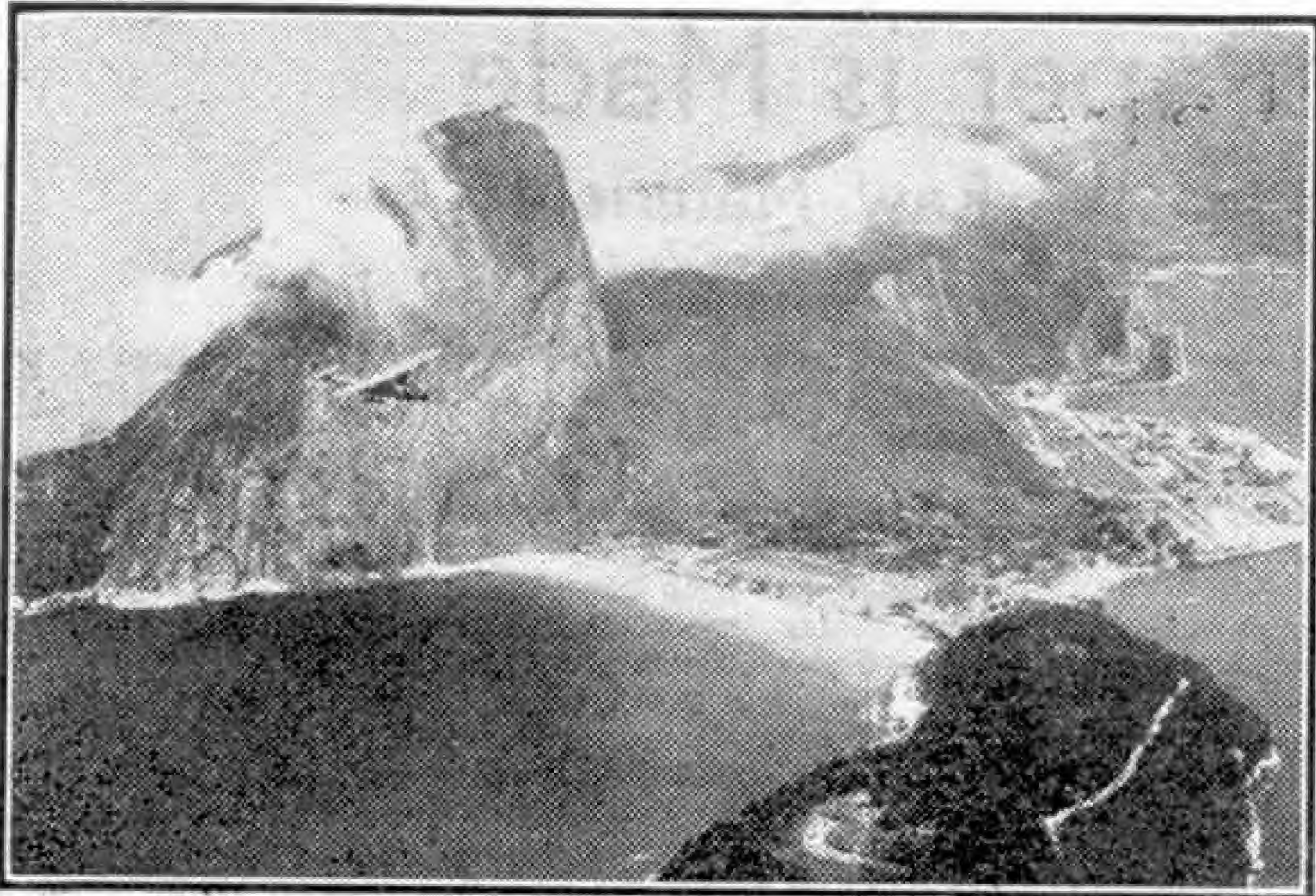
The mountains are somewhat unusual. The ranges have been described as "half mountains," for they rise from the sea on the one side, while on the other is a high tableland; and erosion has given them peculiar forms that are commemorated in such names as the Sugar Loaf. There are other peaks of similar shape to this, the most famous of the tribe, and in addition there are rounded forms described as half oranges, and craggy needles pointing to the sky. One of these needles, a slender tower in the Organ Mountains beyond the city, has become known as the Finger of God.



An aerial view looking out over the city of Rio de Janeiro and its bays towards the Sugar Loaf Mountain.

famous Sugar Loaf, a gigantic pyramid of rock 1,200 ft. high, the dominating character of which is shown in the illustration on this page. The city itself clusters along the shore round the smaller bays, filling the spaces between the rocky heights that mark the beginnings of mountain ranges beyond it, and in the bay itself there are islands to break the monotony; while the wonderful green of the vegetation on the slopes of the hills and the reddish colour of the rocks of which the mountains are formed help to make the city and its surroundings a tropical paradise.

Brazil was discovered by the Portuguese in 1500, really by accident, for Cabral, to whom the distinction belongs, was sailing southward in the track of Magellan when he was blown off his course by storms and reached what is now the Brazilian



The Sugar Loaf, at the entrance to the bay on which Rio de Janeiro stands. The city itself lies along the shores of the bays on the right.

British sailor, and the feat must have been a remarkable one. Now all can get there, more easily and in greater safety, for a cable railway stretches from sea level to a lower height where there is a station, and from there to the pinnacle top itself.

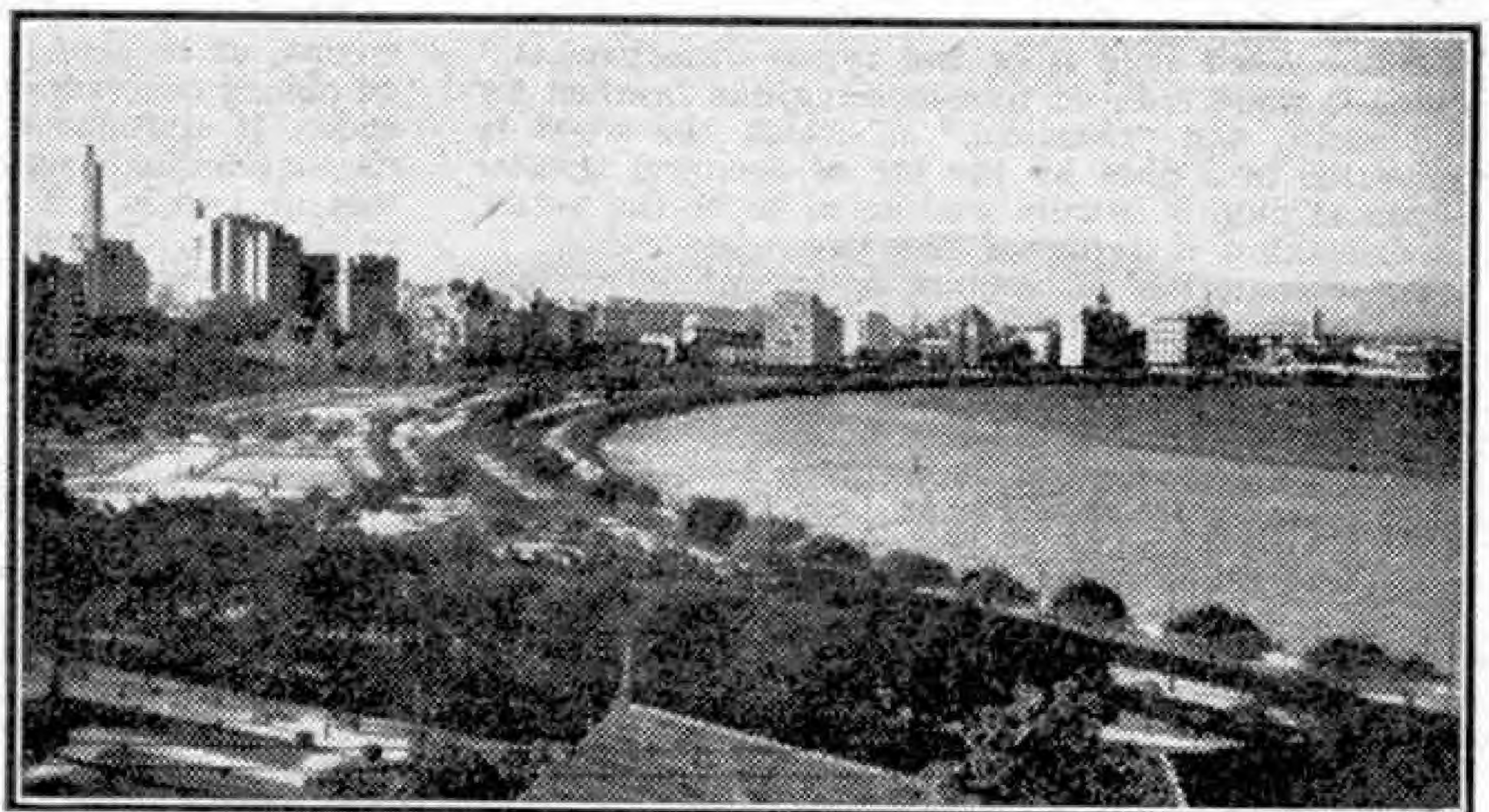
The city itself is thriving and up to date, and in recent years great progress has been made in giving it a typical American appearance and a real business air. The main street is the Avenida Rio Branco, which runs outward from a Plaza or square into which visitors come directly from their landing place on the quay, which is several

miles in length and alongside which giant liners can be berthed. The most remarkable feature of this modern Rio de Janeiro is the growth of skyscrapers, built not in mere imitation of those of New York and Chicago, but in order to make the best possible use of the limited space between the mountains and the beaches. Other avenues stretch parallel to the shore of the bay, and practically everywhere between the buildings and the beaches are wonderful gardens where tropical flowering plants grow luxuriously.

One of the most famous of these beaches is just inside the bay, with the Sugar Loaf looking over it. Botafago Bay is the name given to the stretch of water that breaks on the beach, and the scene in the evening, when the countless lights of the city are reflected on its smooth water, has been described as an (Continued on page 34)

Of all the heights of Rio one of the most famous is the Corcovado, seen on this month's cover. The name of the mountain means the Hunchback, and it towers right over the city itself to a height of 2,300 ft. It is crowned by a huge statue of Christ the Redeemer, with arms outstretched as if in blessing. The statue, 90 ft. in height, was the work of Silva Costa, a Brazilian engineer, and was erected with funds raised by voluntary gifts. It is one of the most remarkable in South America—a continent that is famous for its religious statues in high places, including the well-known Christ of the Andes—and indeed in the whole world. It is impressive at all times, and especially at night, when it is illuminated by powerful floodlights and seems to be suspended above the clouds, surrounded by a halo of matchless splendour.

The summit of the Corcovado is reached by rail, and in the course of the trip the full beauty of the city and its surrounding is gradually unfolded as the train climbs higher and higher. Out towards the Atlantic the great Sugar Loaf, with its amazingly smooth sides, rears its head above the rounded massive rocky heights alongside of it. It is believed that the first man who ever reached the summit was a



Gardens like those seen in this illustration stretch along the shores of the bays of Rio, with mountain ranges beyond the city.

How Paper is Made

I—Treating the Raw Materials

By W. Philip Conolly

PAPER and its salvage have been in the minds of many of us in these war years, during which we have learned of its many and, in some ways, surprising uses, not only for peaceful pursuits but also as aids in modern warfare. It will be of interest to consider how this, one of the most important commodities used by mankind, is produced.

All paper comes from cellulose, or rather is cellulose in a fibrous state that has been treated by the paper-maker. It may serve as a bank-note, in which case it is usually hand-made paper of the very best quality, or as wrapping for a parcel. Its uses are legion and far too many to detail. For the art of making it we are indebted to the Chinese, from whom it came to Europe by way of the Arabs and Moors something over 900 years ago. Various European countries then produced paper, but it was not made in England until the late 16th century, the first mill in this country being erected at Stevenage, Herts. Several other mills came into operation, but for some time most of our requirements were met by French paper-mills.

At one time in our history, paper was subject to a tax to provide revenue, and it was not until the tax was entirely removed, about the middle of the last century, that the product really began to fill the role it plays in our lives to-day.

Many kinds of raw material of a fibrous nature are made to serve the uses of the paper-maker. The principal items relied on are cotton, linen, esparto grass and wood pulp. The first two are used principally in the form of waste rags, either as new scraps from the clothing factories or old waste rags from dealers. Wood pulp is of two types—"mechanical," which is wood reduced to something like sawdust by machinery, and "chemical," in which the wood is converted into fibre by the use of chemical agents. Chemical pulp is usually considered to be the better paper-making material of the two.

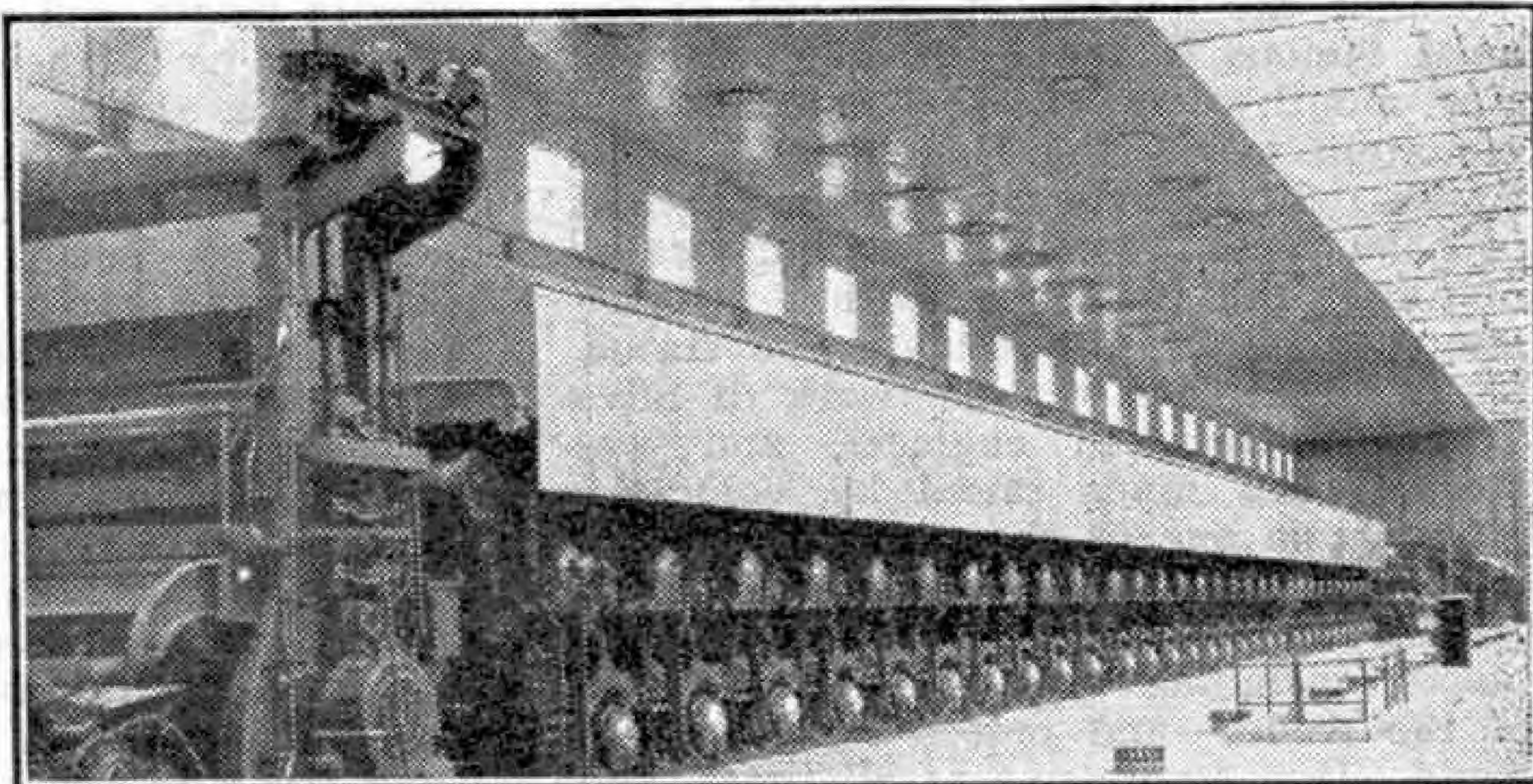
These materials all require treatment in various ways before they become the pulp or "stuff," as it is termed, from which the paper is made on the paper-making machine proper. We have not space to go into detail where every material is concerned, but the general idea can be gathered from the treatment of rags, which give the best types of paper, and of wood pulp, from which comes all our "newsprint," the term given to the paper our dailies are printed on.

Waste rags provide much of the mills' requirements as raw material. These are roughly sorted into their different grades by the dealers, but they are again sorted on arrival at the mill before they go to the rag duster, which is merely a revolving wire cage. The duster gets rid of some of the dust and dirt the rags usually contain, unless they are the new cuttings mentioned above. Incidentally, these new cuttings

are mostly reserved for making the very best paper, particularly as they are the most expensive raw material.

The many foreign articles contained in the rags, such as safety pins, metal fasteners, buttons, rubber, etc., are now removed by women sorters, who also cut the rags into convenient size for the rag boilers. This latter operation is nowadays more often performed by mechanical rag choppers, which first tear the rags into strips and then chop them into small squares.

The rag boilers, often made spherical in shape for better loading, revolve on trunnions and in appearance are somewhat reminiscent of Hero's steam engine. In them the rags are cooked under pressure for perhaps as long as 10 hours. Caustic soda and soda ash are added to remove the dirt and grease

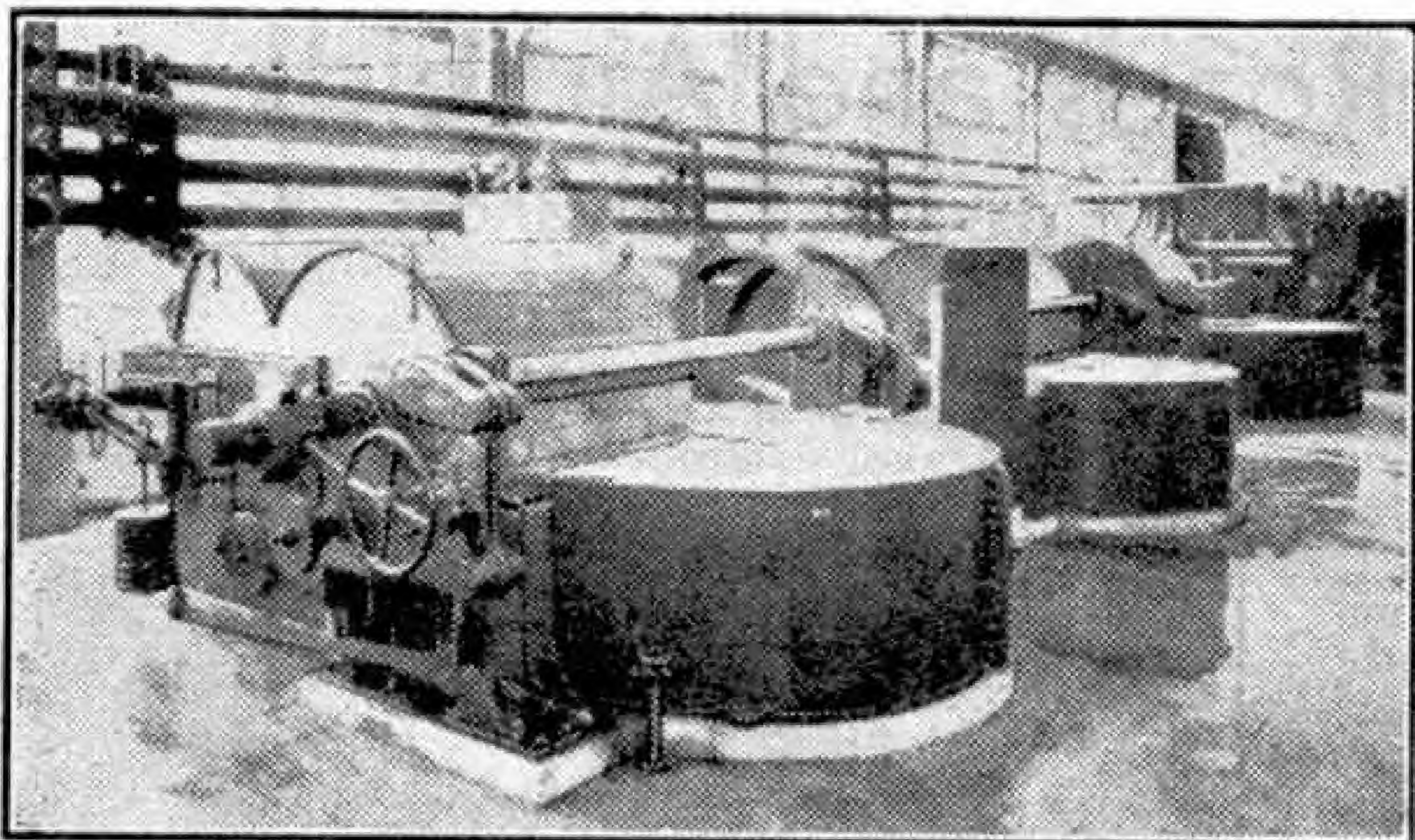


The "Dry" part of a paper-making machine. The hood seen above the two rows of drying cylinder bearings collects the moisture given off by the paper in drying. Photograph by courtesy of Bentley and Jackson Ltd., Bury.

often present in the rags on their arrival.

When sufficiently treated in the rag boiler, the rags have reached the stage when they are known as "half-stuff," and they must next go to the washing engine, or breaker. This can briefly be described as an oblong concrete or cast-iron tub with semi-circular ends. It contains a partition or mid-feather along its longitudinal centre-line, except that a gap of a foot or two is left at each end to enable the stuff to circulate. To one side of the mid-feather is fitted a large cast-iron roll carrying bars on its face. These work in conjunction with bars in a bed-plate below the roll, reducing the rags to threads and fibres and generally preparing them for the beaters, which continue the process. In the opposite half of the tub one or sometimes two drum-washers revolve, carrying away the dirty water as it is released from the rags.

The man in charge of the breaker has to exercise great skill in manipulating the roll, which can be raised or lowered on the stuff. Too heavy use of the roll will cut the rags too drastically, and a large percentage of fibre will be lost in the water outflow. The first action is to convert the rags into threads, and when this has been done, the threads are brushed out into fibre and yarn. Ingrained dirt is released at the same time, and carried away by the drum-washer; and any stray buttons, etc. are



The beater room in a modern paper mill. The illustrations on this page are reproduced by courtesy of Bertrams Ltd., Edinburgh.

action of the roll until it has become almost entirely fibre, due to its having passed between the "tackle," that is the knives on the roll face and in the bed-plate.

Before the stock is let down to the paper machine chests, or into the stuff chests, it must be refined or "cleared," that is freed from the small clumps of fibre and other particles that would spoil the finished paper if they were not eliminated. Refining can be done in the beater but this consumes a large amount of time and power in the process. The refiner which undertakes this last operation is, in essentials, a rotating cone carried on a throughgoing shaft and running inside a coned shell. Cone and shell are both fitted with elbow-shaped bars, similar to those on the beater. The cone, being adjustable, can have its bars brought into contact with those in the shell, so providing the

cutting action necessary to reduce the lumps in the stock. Cleared stock passes through between the bars without further treatment; only the lumps are dealt with.

dropped into the button catcher. Heavy particles of dirt leave by way of the sand-trap.

Bleaching also may be effected in the breaker, or in separate steeping chests. It is accomplished by the use of chloride of lime or chlorine, which gives to the stuff a good pure colour on its ultimate appearance as paper.

The stuff or stock is now ready for the beating engines, but before dealing with these we may glance at the preparation of wood pulp, which will reach the beaters in due course. We have noted that wood pulp is obtained in two ways, either mechanically or chemically. It comes chiefly from the soft-wood or coniferous variety of trees, spruce being the commonest species used. The mechanical wood is ground in a machine that has a large and heavy revolving grindstone, the logs being pressed on its face as it rotates. Logs ground in the presence of very little water give what is known as "hot ground" pulp. "Cold ground" pulp is produced merely by using a greater quantity of water, which washes the pulp down and keeps the stone cool. A third quality pulp is obtained by the same method, but after the logs have been boiled or steamed.

Chemical wood pulp has been reduced to fibre by heating in a boiler or digester under pressure with sodium sulphite. In this process the logs after cleaning are shaved into small chips, and then passed to the digesters to be converted into fibre. Both types of pulp are often made up into boards for ease of transport. These are "furnished" to the beaters when passing to their next stages in treatment.

"Broke" is a term used when referring to paper which for some reason has not reached the final stage in production. It may be still in the pulp stage, or paper that has been rejected due to its poor quality. If it is in the form of paper, it has to be reduced to fibre again, and this is often done in pulpers, conical-shaped machines containing rotating arms which break up the paper. A Kollergang or edge-runner is used for the same purpose. This consists, in the main, of a shallow circular pan in which two large stones rotate upon an axis, so that they partly roll on the stone bed of the pan and partly drag. The builders' mortar mixer is nearly an exact parallel to the Kollergang.

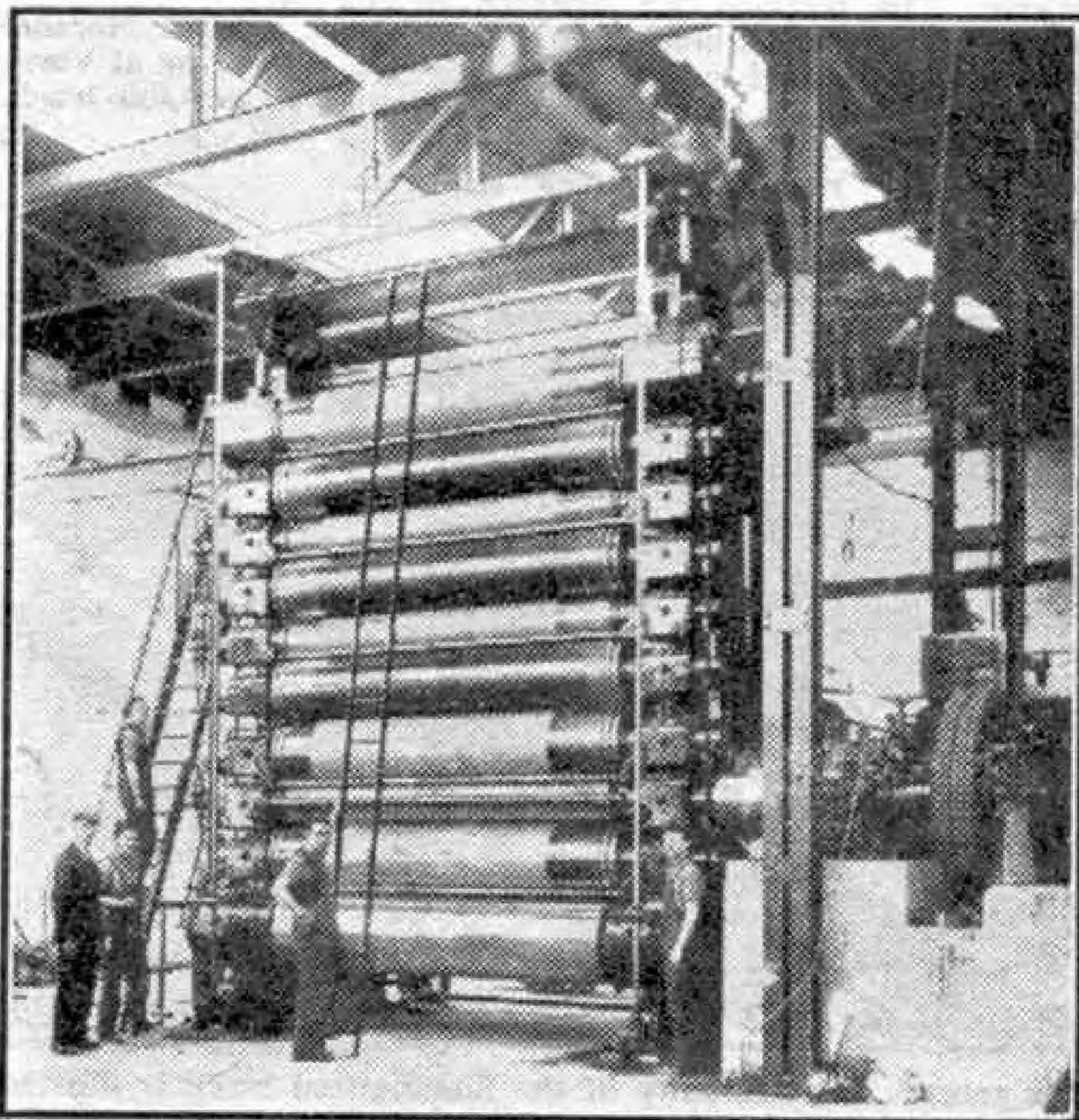
The beater or "Hollander" was first used about the middle of the 18th century in Holland. Its design has been subjected to many alterations and improvements, but basically it is very similar in its main features to the breaking engine. The half-stuff is circulated round the trough or tub by the

Only three more operations remain to be carried out before the stuff goes to the paper-machine. Paper must be sized to make it resistant to ink. This is undertaken either in the beater, and is known as "engine sizing," when a resin-alum size is used, or on the making machine, when the paper web runs through a bath of gelatine solution and is then dried in running through heated drying cylinders. This second method is called "tub-sizing."

"Loading" or filling the paper to close its pores, so giving it a smooth and opaque finish, is done by the introduction of china clay to the contents of the beater. Sulphate of lime also serves the same purpose.

Colouring is the final operation; dyestuffs for coloured papers, also for white varieties, are added to the contents of the beater and are mixed with the "stuff" before it goes to the paper machine.

(To be continued)



A 10 roll super-calender which gives paper its smooth surface.

Portable Roads and Airfields

Sommerfeld Track Aids Allied Advances

By M. Schofield

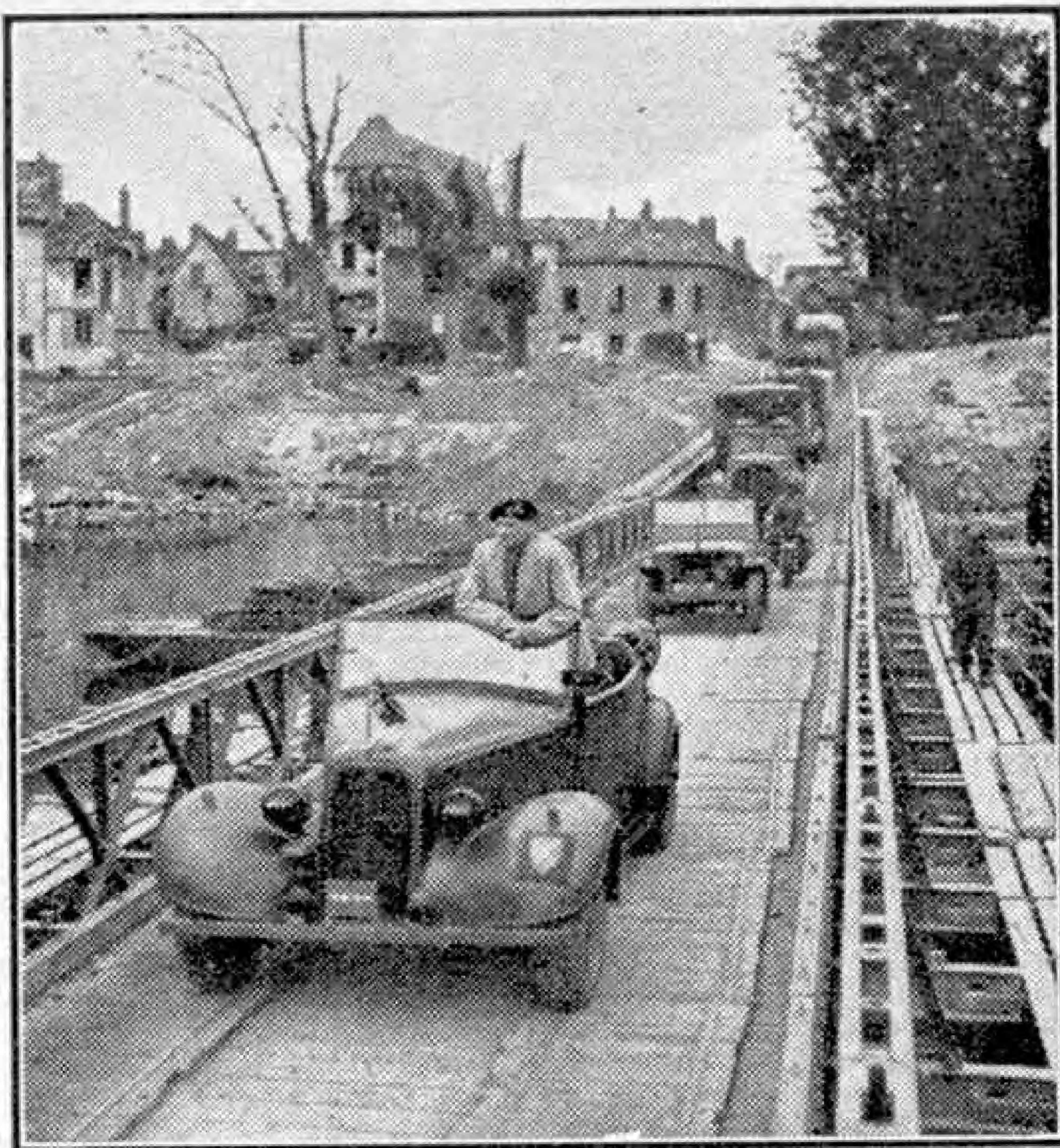
RECENT accounts of a great port constructed in this country and transported to Northern France are matched by the story of the Sommerfeld portable roads and airfields carried by the Allied forces, which will be laid right into the centre of Germany. Both in that first invasion of Normandy, and now, when muddy roads and fields hamper essential transport, this portable track proves of vital importance. When President Roosevelt reported to Congress on Lend-Lease in May last, he quoted, among other instances of vital war supplies, 44,500,000 yds. of it sent up to the end of 1943. Enormous use of this track was made in our campaigns in North Africa and Italy.

There are two distinct types of track, and tests of their efficiency were made at Denham in this country, where marshy ground was converted into runways and roads in incredibly short time in the rehearsal before D Day. With main roads destroyed in many places, and by-pass roads having to be made around devastated towns; with the necessity for laying down landing grounds quickly for our fighters and rapidly repairing airfields damaged by the enemy—those millions of yards of track carried across the Channel were needed to solve our problems.

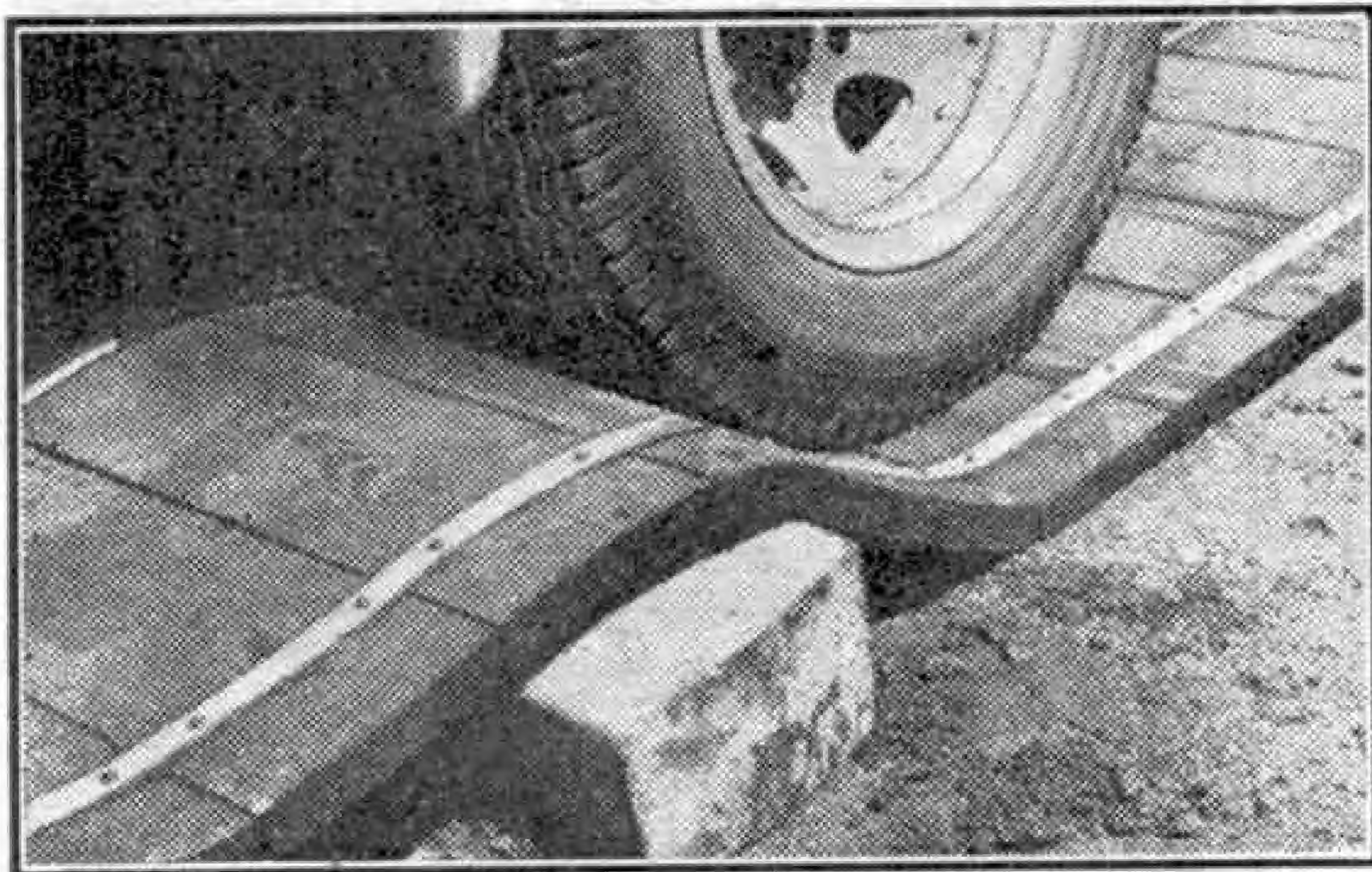
When the ground is marshy or excessively muddy, road tracks for Army vehicles are made of continuous connected duck boarding of up to 2 in. in thickness, reinforced with flexible steel bands. Sections are 9 ft. long and 3 ft. wide, and these are unrolled and joined together by the use of dowels, the ends of the steel strips having loops for the insertion of the dowels. The sections are picketed to the ground to prevent them from "creeping" with the passing of heavy traffic.

For other roads, and for all portable airfield surfaces, the Sommerfeld mesh of strong wire netting becomes the reinforcing medium for binding the soil and

enabling even the heaviest aircraft to land and take off. This stout netting is reinforced with steel bars, and when transported is in rolls like rolls of wire



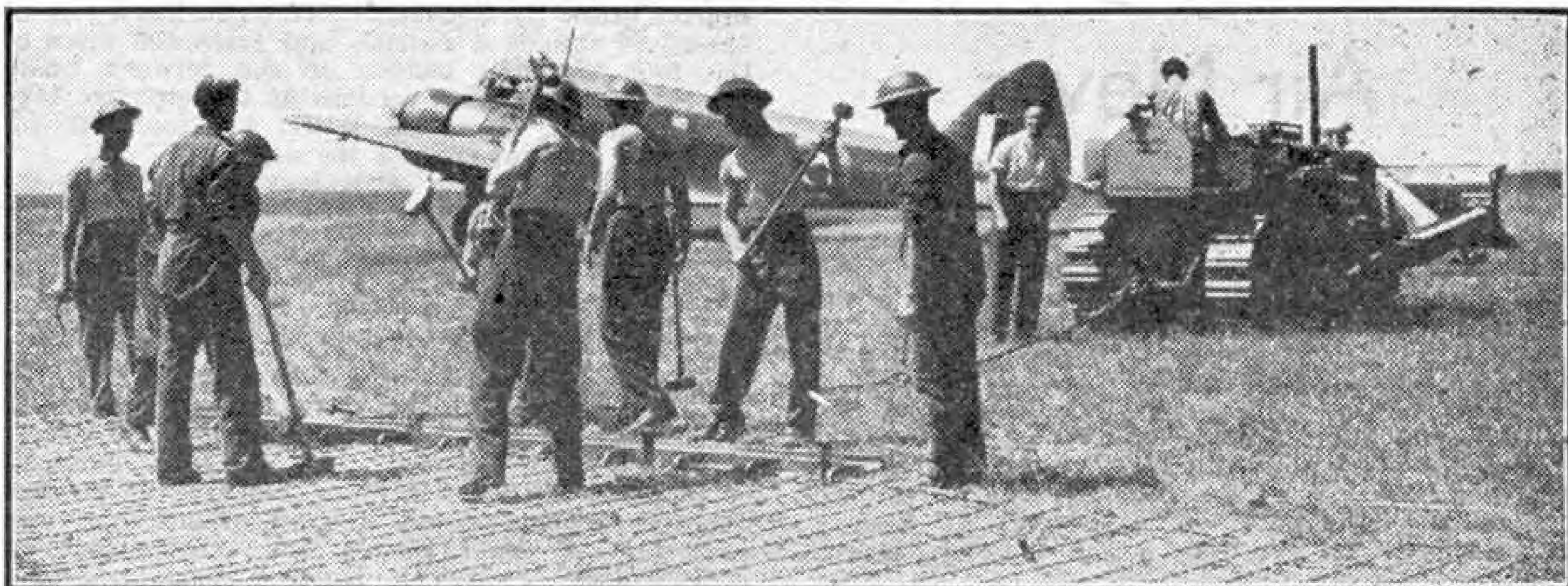
Field Marshal Montgomery crossing a Bailey Bridge over the Seine at Vernon. The bridge surface is laid with the Sommerfeld portable track. The illustrations to this article are British Official Photographs, Crown Copyright Reserved.



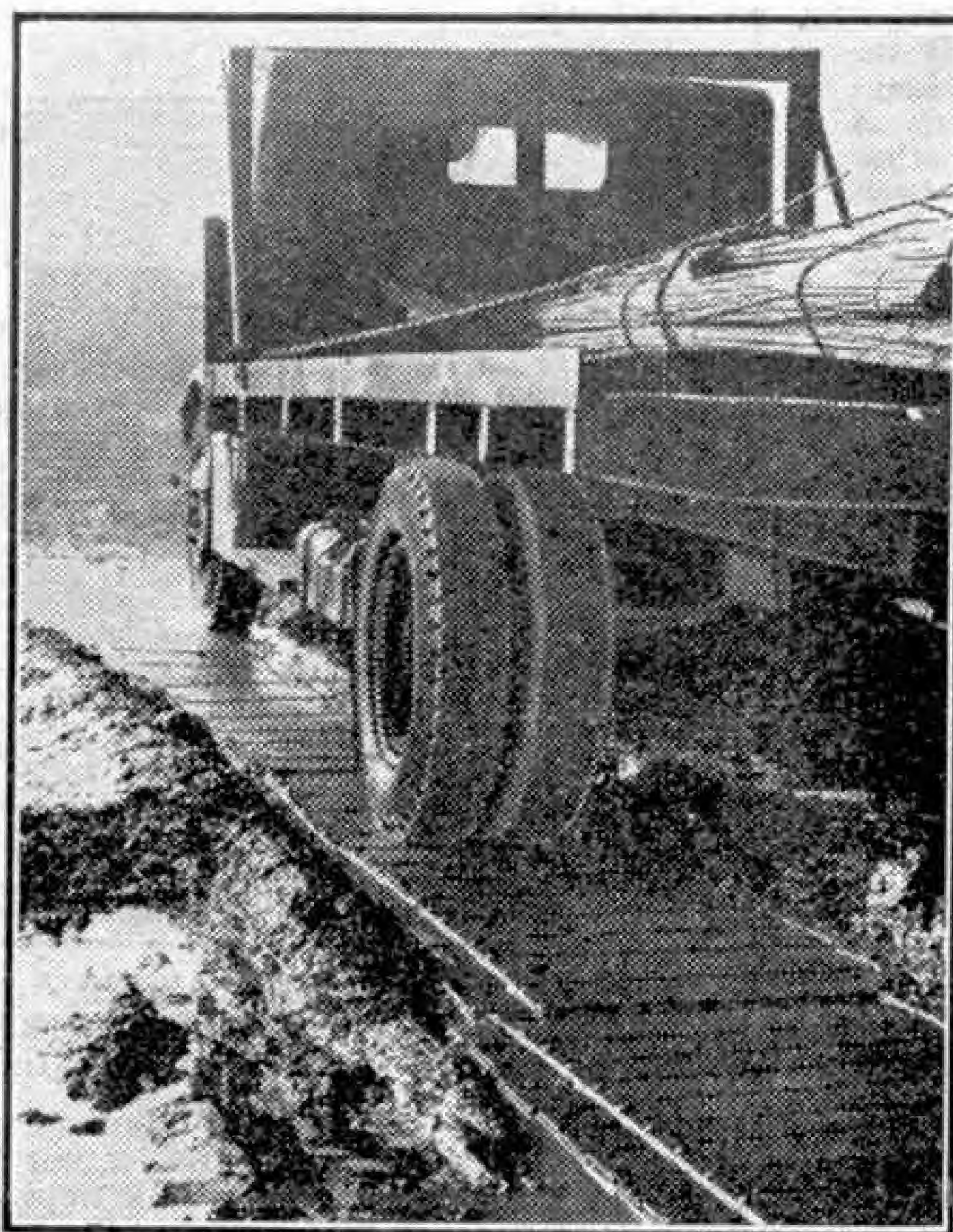
The remarkable flexibility of the Sommerfeld track is illustrated by this photograph showing a wheel of a 10-ton lorry going over a section laid over an obstacle.

netting for poultry runs. More than 52,000 sq. yds. can be carried in 18 twelve-ton lorries, and this is sufficient for an airfield. On arrival at the new site the track is unrolled, and steel bars are inserted along the edges and fastened by spikes driven into the ground. A runway for aircraft is provided by 15 tracks laid side by side and secured at the edges. The track is stretched taut by a tractor, or by a tank at times. If the road should be bombed, little labour has been lost, for a new track can be laid quickly or a portion replaced.

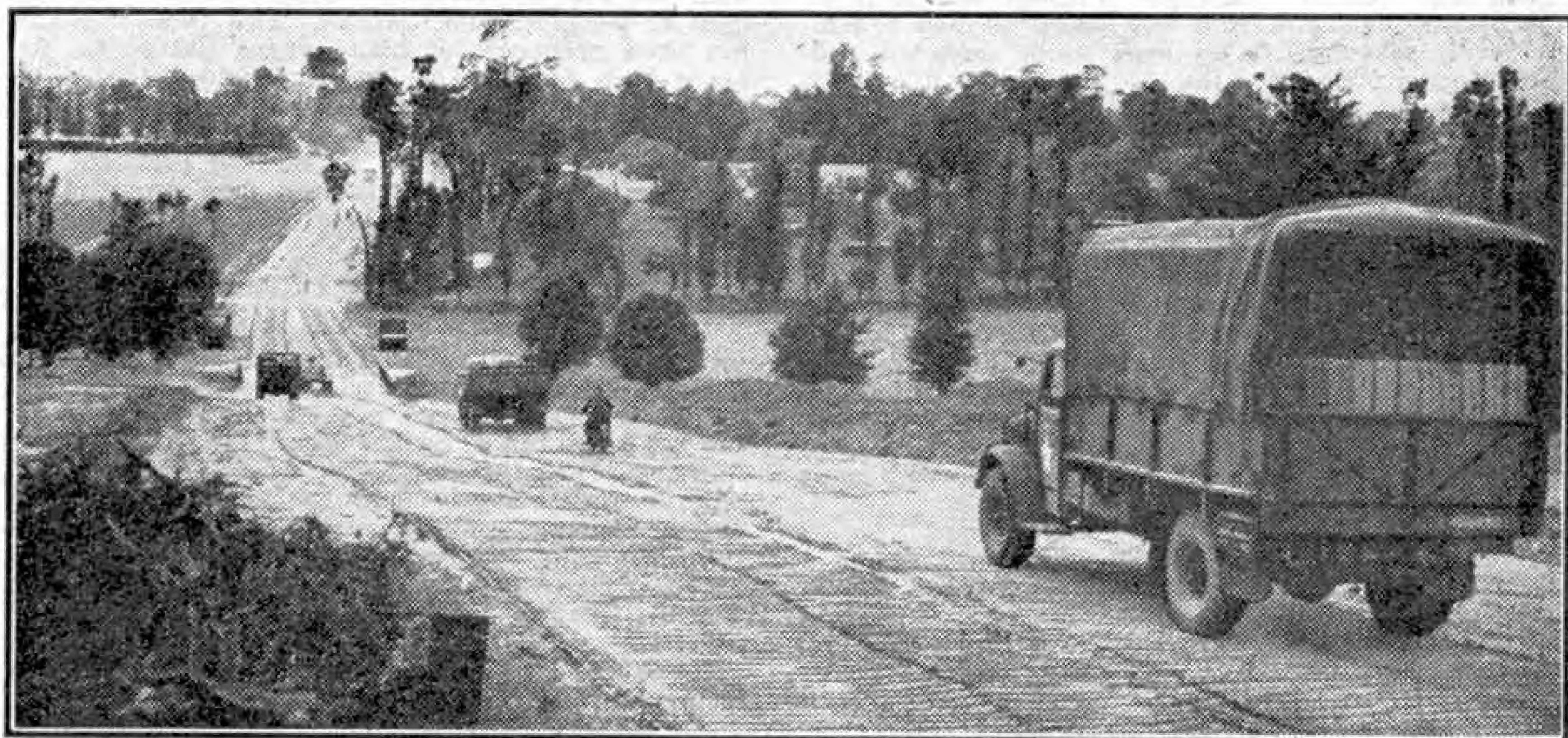
Since D Day Sommerfeld track airfields have given our fighters the opportunity to protect our troops from occasional attack by the Luftwaffe, for advanced airfields can be made rapidly by this method, which has become the standard one for our Forces. Special units have been trained to construct such flight strips and fields in a matter of hours. The material required for making tarmac or concrete runways of an airfield of the same size would demand 2,500 lorries for its carriage and weeks would be spent in construction.



The illustration above, reproduced by courtesy of "The Daily Herald," shows the construction of a Sommerfeld portable runway for aeroplanes, with men spiking the wire netting in position as it is stretched taut by a tractor. On the right the use of Sommerfeld portable track is illustrated in conditions that would bog down transport without the equipment.



Sommerfeld track roads can be laid in record time across country to relieve congestion, or to by-pass towns where there are traffic jams, and the illustration at the foot of the page shows vehicles loaded with supplies being rushed to forward areas over a by-pass at Bayeaux, Normandy, the surface of which is provided by Sommerfeld track.



Air News

The New "Mitchells"

Several new versions of the North American "Mitchell" bomber are in action on both the European and Pacific war fronts. The first, the B-25H, is the most heavily armed aeroplane in the world, as in addition to a 76 mm. gun mounted in its "solid" nose it has fourteen .50 in. machine-guns. Four of these guns are fixed in the nose, two "package" guns are carried on each side of the cockpit and fire forward, new tail and upper turrets each have two guns, and there is one on each side of the fuselage just behind the wing. The B-25H is being built at Kansas, U.S.A., together with the B-25J, another bomber version of the machine.

The B-25J is in general similar to the B-25H, but has a standard transparent nose for the bombardier, fitted with a single .50 in. gun. The other ten .50 in. machine-guns are in the same positions as those of the B-25H. Yet another version of the "Mitchell" has been modified to carry a further four .50 in. machine-guns in its nose instead of the 75 mm. gun, making a total of 18. All these versions also carry the full 4,000 lb. bomb-load.

An earlier "Mitchell" in service in large numbers with the Red Air Force has a two-gun ventral turret instead of the tail turret, and can carry up to 6,000 lb. of bombs.

An interesting comparison is that the "Mitchells" used by General "Jimmy" Doolittle in the first raid on Tokyo were armed with only three machine-guns, but also carried two painted broomsticks to scare off Japanese fighters!

J.W.R.T.

Handley Page "Hermes" Air Liner

More details are now available about the new Handley Page "Hermes" air liner, briefly referred to in the November 1944 "Air News." Construction of the first machine is well advanced.

The "Hermes" is a low wing all-metal monoplane of 113 ft. span and is 81 ft. 6 in. long, with four 1,650 h.p. Bristol "Hercules" engines which, it is calculated, will give it a top speed of 340 m.p.h. It is the first British air liner to be designed and built with a pressurised fuselage for comfortable flight at heights up to 25,000 ft. This fuselage is of circular cross-section. Alternative schemes for the passenger accommodation in it have been designed, and include a "super luxury" arrangement on Pullman car lines for 20 passengers, a version providing armchair seating for 32 passengers by day and berths for 16 by night, a standard long-distance arrangement for daytime flying in which 34 passengers are accommodated, and a short-range flight version with seating for 50 passengers. The crew will consist of two pilots, flight engineer, navigator, wireless operator, and one or more stewards. There will be four compartments for the stowage of luggage, mail, and freight.

An all-freight version of the "Hermes," with non-pressurised fuselage, also will be available.

Another Version of the "Mosquito"

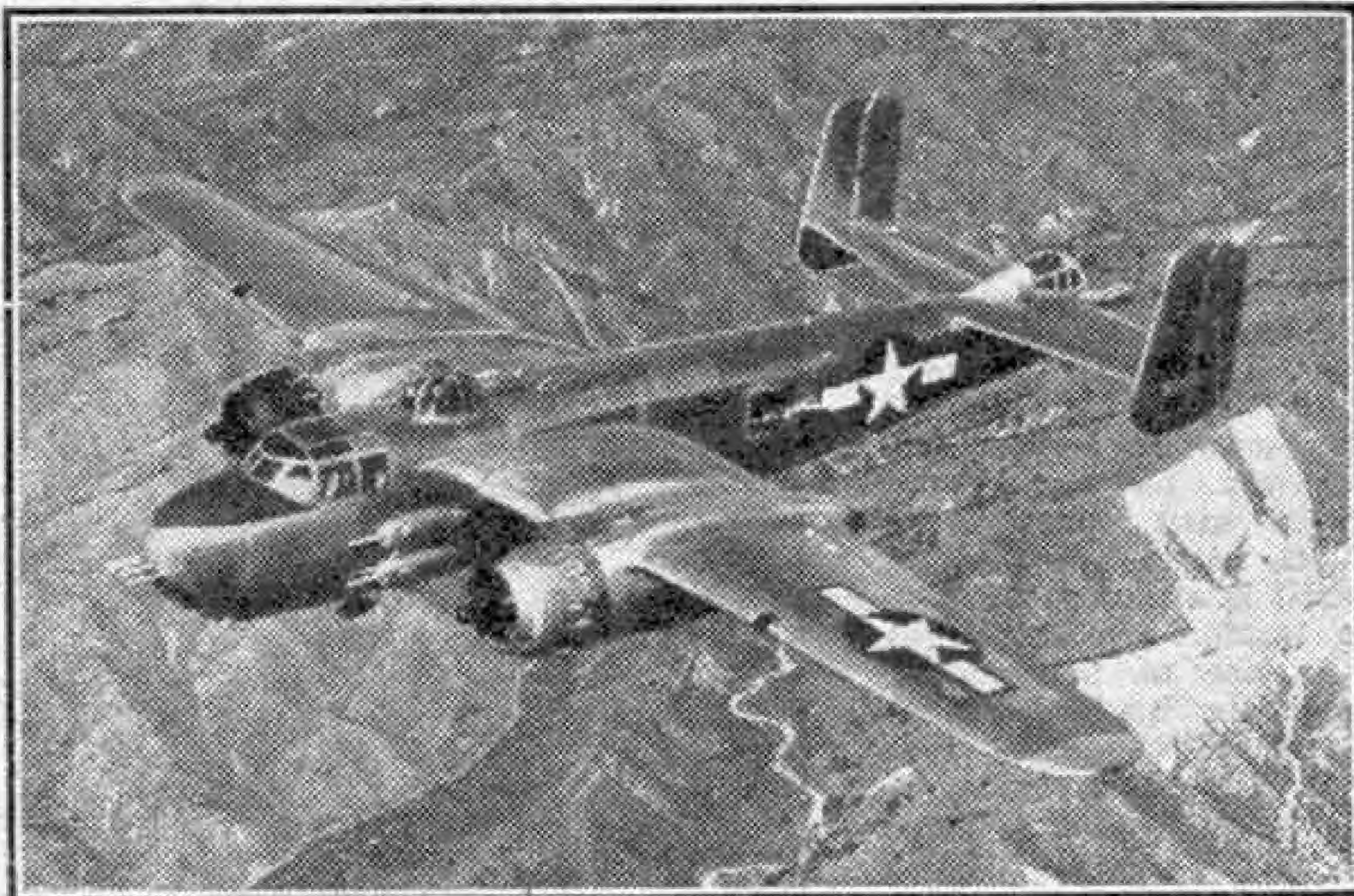
It was announced recently that yet another version of the famous D.H. "Mosquito" has been in service during the past year. This is the "Mosquito" XVIII, armed with a 57 mm. (six-pounder) gun in the forward part of the fuselage and mounted to fire several

degrees below the horizontal. This gun has a rate of fire of 60 rounds a minute, and takes the place of the four 20 mm. cannon in the forward bomb bay of certain earlier versions of the aircraft. Like those versions, the Mark XVIII has four .303 in. Browning machine-guns in the nose.

"Mosquito" XVIIIs with long-range fuel tanks under the wings are being used with great success by R.A.F. Coastal Command for attacking enemy submarines and shipping in the North Sea and the English Channel.

Gas Turbine Aero Engines of 10,000 h.p. Forecast

Gas turbine aircraft engines of as much as 10,000 h.p. will be available for giant aircraft within the next decade, according to the President of the Wright Aeronautical Corporation, U.S.A. He announced recently that after the war this company will produce aviation turbines as well as conventional type aero engines, and that research and development on turbine units are now in hand. Development of a turbine of the power mentioned would mean more energy in one unit than in all four engines of the



The North American B-25H "Mitchell," claimed to be the most heavily armed aeroplane in the world. Photograph by courtesy of North American Aviation Inc., U.S.A.

Boeing B-29 "Superfortress," the biggest bomber now in service, with its four "Cyclones," totalling 8,800 h.p.

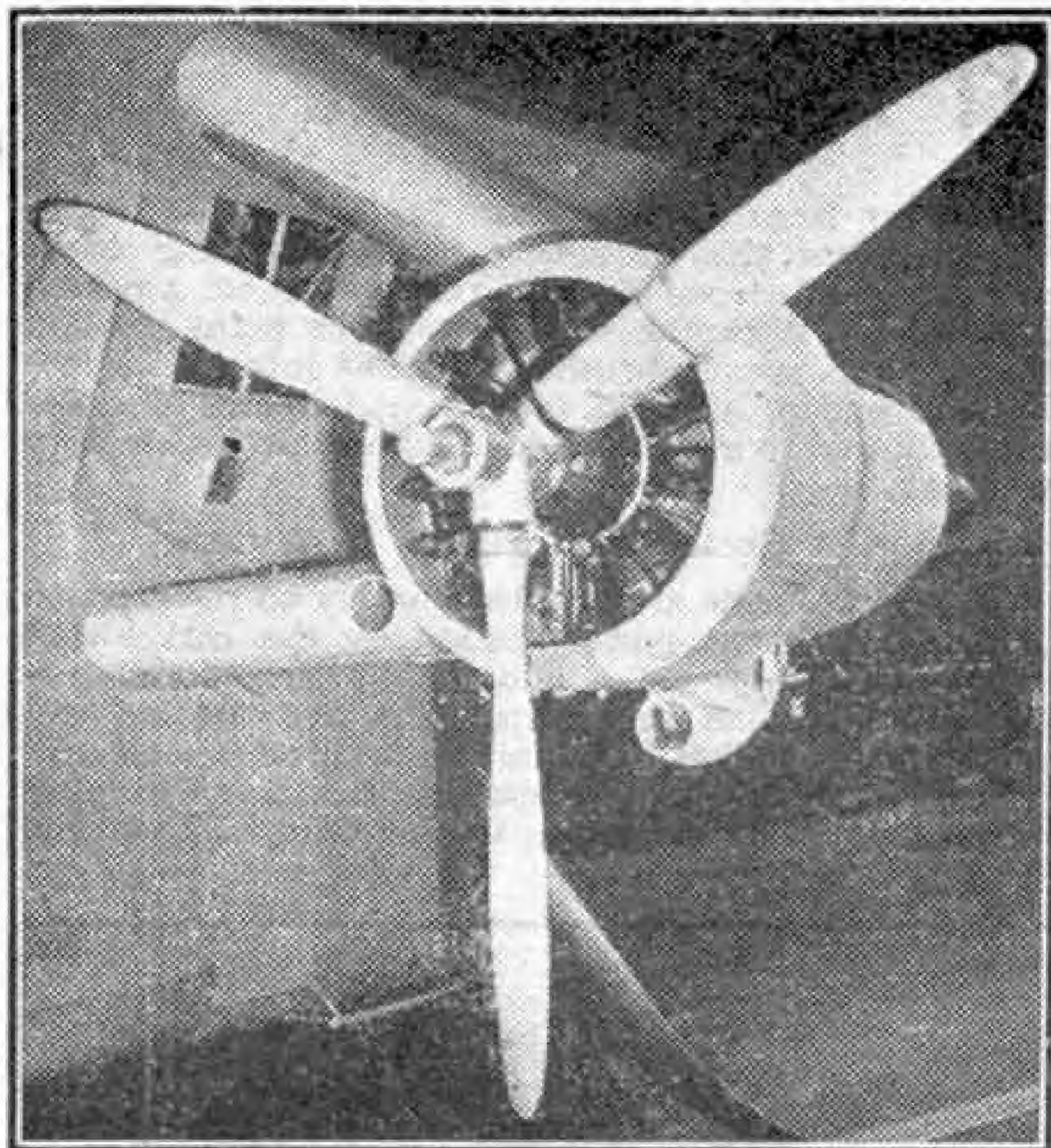
One type of Wright gas turbine will be an engine of high power built to drive a propeller, as contrasted with the turbine units of basically similar principle used in jet propulsion aircraft. This type of engine has been proposed for many years, but so far has never been flown. The President added that while the principles of gas turbines had been known for years, it was only recently that research had improved their efficiency to a point of practical use, and that advances in metallurgy had provided the metals to withstand the heat and power stress of such engines.

The "Stirling" as a Glider Tug

Among the aircraft used for glider towing in the recent airborne operations was the Short "Stirling" G.T.IV, which has been developed from the "Stirling" III bomber. It has no nose or mid-upper turrets, but the 4-gun tail turret has been retained. A Perspex fairing replaces the nose turret, and the glider-towing equipment is carried under the tail. A number of supply canisters can be carried in the huge bomb-bay, and they are dropped in the same manner as bombs. The "Stirling" G.T.IV has four 1,650 h.p. Bristol "Hercules" engines.

J.W.R.T.

A total of 10,000 Boeing "Flying Fortresses" has been produced in the United States.



One of the reverse-thrust "air-brake" Curtiss electric propellers used on the Goodyear M-1, the U.S. Navy's latest and largest blimp.

Reverse Thrust Propellers as Brakes

Large heavily-laden aircraft have to make long take-off runs to attain the required flying speed, and similarly require long runways on which to land and slow down to a halt. Research is always going on to find means of achieving the same results with shorter runs, as shorter runs mean less wear of undercarriage tyres and less time spent in taxiing across the airfields.

Some recent U.S. Army tests have shown that one way in which the landing run of twin and four-engined aircraft can be considerably shortened is by "air braking" with reverse thrust propellers. Immediately the machine touches down, the operation of a reversing switch changes the angles of the propeller blades to negative "pitch," which creates a backward thrust or braking effect. The changing of the blade angle does not affect the rotational direction of the propeller.

In tests with four-engined aircraft it was found that the reverse thrust of two propellers brought the taxiing machine to a halt just as effectively as when the undercarriage brakes were used; and that the use of two or four propellers reversed, in combination with the wheel brakes, resulted in a great reduction of the landing run. These special propellers are now in quantity production at Curtiss-Wright Propeller Division's factories in America, for use on U.S. Army four-engined transport aircraft.

Reverse-thrust Curtiss electric propellers have been fitted to the U.S. Navy's latest and largest blimp, the Goodyear M-1, designed for anti-submarine patrol and built by the Goodyear Aircraft Corporation. A photograph of this blimp appears on this page, and a

close-up of one of its three-bladed propellers is shown in the upper illustration. They are the first propellers of this kind to be fitted on a lighter-than-air aircraft. By reversing its propellers during flight the M-1 can virtually halt in mid-air, and can pivot round by reversing only one of them; other variations give the blimp faster take-offs and more fully control its landings.

American Aircraft Developments

Many U.S. aircraft are being fitted experimentally with Ed. floats to test their suitability for operation as float-planes in the Pacific war zone. Among the types so far modified are the "Skytrain" ("Dakota"), "Helldiver," "Vigilant," and "Wildcat." The "Dakota" and "Vigilant" have also been tried out as amphibians, and the last-mentioned is being used on the Burma Front for evacuating 14th Army wounded from forward areas.

An American report states that the N.A. "Mustang" is being fitted with a Rolls-Royce "Griffon" engine, which considerably enhances the already exceptional performance of this fighter. The "Mustang" is also in production in Australia.

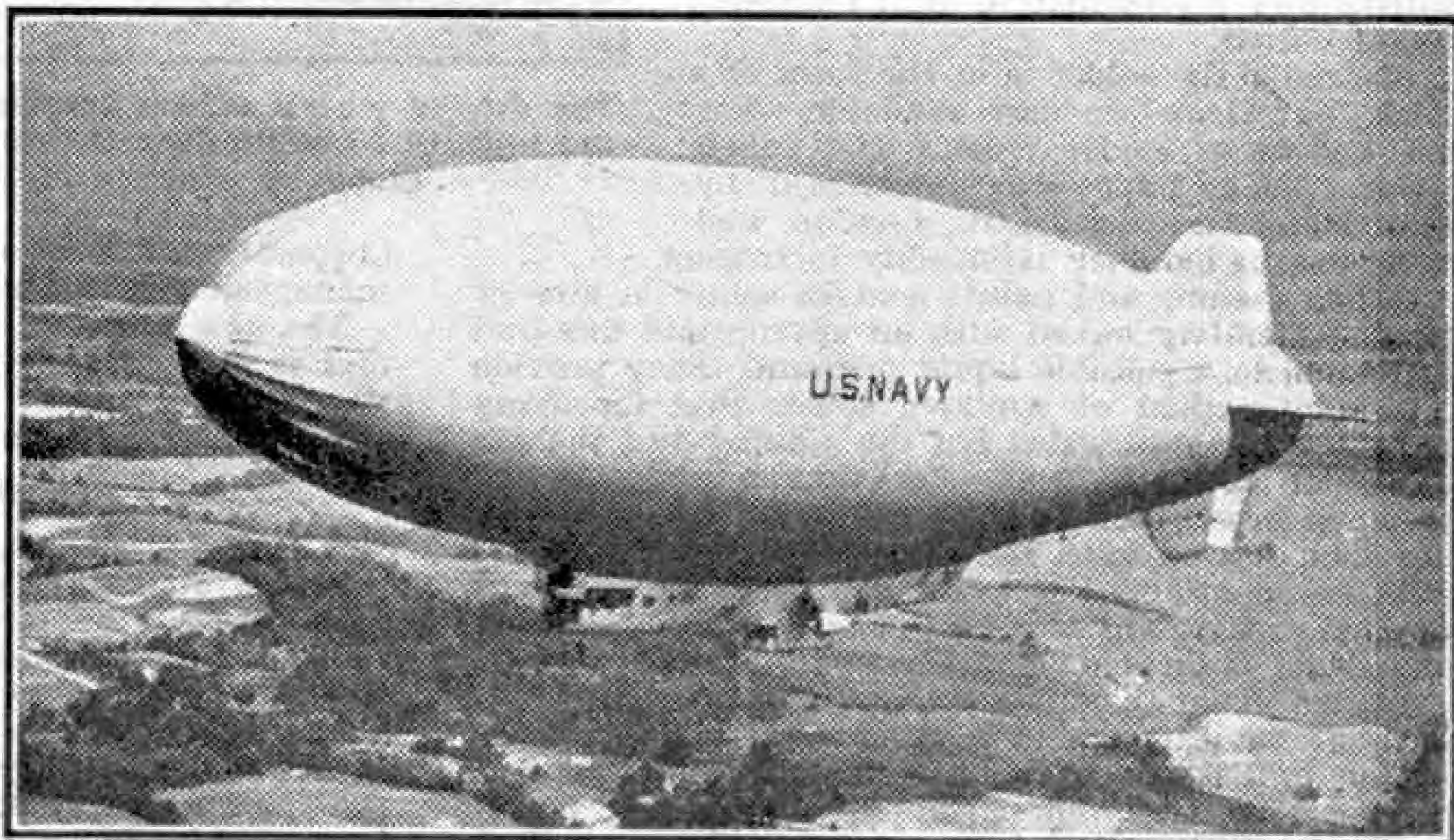
A new Lockheed fighter is going into production at Burbank, California, but no details have been given. The Lockheed PV-2 "Harpoon" naval bomber is a development of the PV-1 "Ventura," but has less pointed wing tips, and outrigger fins and rudders on a rectangular tailplane.

The new single-seat, twin-engined Grumman naval fighter F7F-1 developed from the "Skyrocket" is to be named "Tigercat." Grummans have also built the prototype of a two-seat light aircraft intended for the post-war private owner. It has a 125 h.p. engine, which gives a top speed of 185 m.p.h.

The Consolidated B-32 "Dominator" bomber is now in full production in America. It has been designed to the same specification as the B-29 "Superfortress" and is powered by four 2,200 h.p. Wright "Duplex-Cyclone" R-3350 engines.

Chance Vought have designed and built a twin-engined light aeroplane for post-war production. Several of their "Corsair" fighters have been modified for photographic-reconnaissance duties in the Pacific theatre, with a K-21 aerial camera installed vertically in the fuselage. Other "Corsairs" are operating with two 1,000-lb. bombs carried side-by-side under the fuselage.

J.W.R.T.



The M-1 in flight. It is designed for anti-submarine patrol. Photographs on this page by courtesy of Curtiss-Wright Corporation, U.S.A.

Flight testing of the Fairchild C82 Freighter has begun. This machine is of 106 ft. wing span, with two 1,600 h.p. engines, and long twin booms extending rearward from the engine nacelles. The fuselage is reported to be nearly 80 ft. long and unusually deep.

Engineering News

Giant Wheels Prove Unsuccessful

In "*Engineering News*" last month we illustrated a new type of endless track designed by Roadless Traction Ltd., which is now undergoing experimental trials. When applied to a tractor or other suitable vehicle in the prescribed manner, the effect given by the track is the same as if a driving wheel of enormous diameter were used. It is well known that the larger the driving wheels the better the pulling power and general performance of a vehicle, but unfortunately in practice there are limits to the size of the wheels that can be used. A good illustration of this is seen in the large agricultural traction engine shown on this page. This was built by John Fowler and Co. (Leeds) Ltd., about 1889, and was fitted with giant driving wheels 12 ft. in diameter. It is believed that these wheels are the largest ever fitted to a self-propelled vehicle, but for a variety of technical reasons they were not a success and the experiment was never repeated. This vehicle is believed to be the only road locomotive, tractor or ploughing engine that has ever been built with wheels exceeding 7 ft. in diameter.

Developments in Soldering Methods

Readers will be familiar with the process of joining metals by means of a fusible alloy known as solder, which melts at a comparatively low temperature. Usually the alloy consists of tin and lead in varying proportions, according to the purpose for which the solder is required. Under the influence of heat and with the aid of a suitable flux, this material is capable of making a joint between metals that is of sufficient tensile strength for many kinds of sheet metal work. The purpose of the flux is to float off and destroy the film of oxide that forms on metal surfaces when heated, and if not removed prevents the satisfactory amalgamation of the surfaces to be united.

Normally the solder is in the form of a stick, but there are now available what are known as solder creams and solder paint. These have been introduced by Frys Metal Industries Ltd., London, and their use in industry is steadily increasing.

Solder creams and paints contain solder in powder form, intimately mixed with an appropriate flux and embodied in a suitable liquid medium. They provide a simple method of applying solder that for many purposes has superseded hot dip tinning and the use of solder in stick form. For tinning purposes the cream is brushed on to the parts to be treated which are then heated until the solder melts and forms an adherent coating. For sweat soldering the cream is applied to the joint members before assembly, so that the solder is located definitely in the joint.

Solder paint can be thinned down with water without causing undue separation of the powdered solder, and it can then be applied to large surfaces of metal by spraying or dipping.

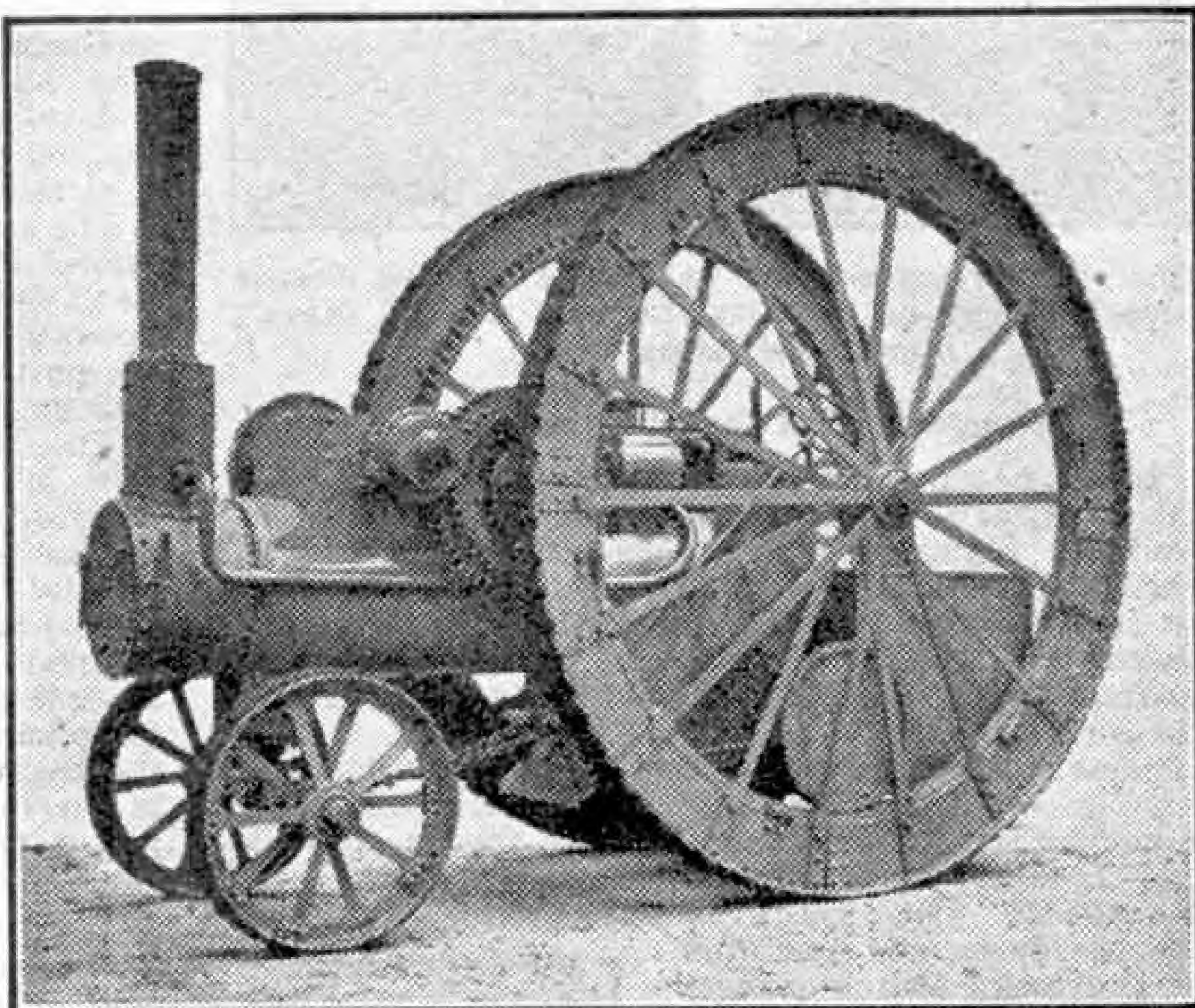
The creams and paints are available in various types. For example, one type contains pure tin and is specially intended for soldering and tinning food cans, for which normal lead-tin solders are undesirable.

An excellent example of the many industrial applications for solder creams or paints is the tinning of torpedo bodies. These have to be tinned on their inner surface, and normally this would have to be done by dipping the entire torpedo in a huge bath of molten solder, precautions being taken to prevent

the solder from adhering also to the outside of the torpedo. For this purpose a tank containing about one ton of solder would be required even for a partial immersion. With the solder cream or paint method the solder is simply brushed over the internal surface of the torpedo, which is then heated to the temperature required to melt the solder and ensure satisfactory tinning.

A Great Power Station in Wirral

Work is to begin almost immediately on the erection of a great electric power station by the Birkenhead Town Corporation on a fine site at Bromborough a few miles outside the town. The new station will cost about £3,500,000, and will produce electric power for the Central Electricity Board, so forming an important feeder station for the Grid. Birkenhead



The driving wheels of this traction engine are 12 ft. in dia., and are believed to be the largest ever fitted to a road vehicle. Photograph by courtesy of Roadless Traction Ltd.

Corporation will be responsible for the erection and management of the station.

The new plant will be one of the largest in Britain, and is one of a number to be erected in different parts of the country in connection with the post-war general electrification scheme.

Electro-Magnets Reduce Tyre Punctures

Tacks, nails, bolts and other small pieces of metal that fall on road surfaces are a source of annoying and time-wasting trouble to motorists, since they cause a large proportion of total tyre punctures. In North and South Dakota, in the United States, an attempt is made to reduce tyre trouble from these causes by fitting to police patrol cars electro-magnets that pick up any metal within their range as the cars pass along. Usually the vehicles collect about 12½ tons of these scraps of metal in a year.

Re-building the Dnieper Dam

When the Red Army retreated before the onslaughts of the Germans in 1941, they blew up the great Dnieper Dam, one of the greatest achievements of the Soviet Union. Among the plant destroyed were nine huge turbo-generators, and new machines to replace these are to be made in the United States.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller. We can supply copies to readers who are unable to place orders in this manner. Order from Book Department, Meccano Ltd., Binns Road, Liverpool 13, adding 6d. for postage.

THE CUCKOO AND OTHER BIRD MYSTERIES

By CAPTAIN BERNARD ACWORTH
(Eyre and Spottiswoode. 10/6 net)

Captain Bernard Acworth, D.S.O., R.N. (retd.), is well known to "M.M." readers for his fine articles on Naval subjects. In addition to being a Naval expert he is a keen student of bird life, and in this interesting and unusual book he gives us the results of his observations on bird flight and migration, and on the mystery of the cuckoo, a bird that has been a puzzle for many centuries.

The first section of the book deals largely with the way in which birds fly, the effect on their flight of different speeds and directions of wind, and the problems of bird navigation. There are also chapters on the migration of swallows, the flying feats of gulls, the desertion of nests, and the bird mind. The remaining section is devoted to an attempt to solve the baffling mystery of the cuckoo. The author first of all surveys the conclusions arrived at by other investigators and explains how these fail to satisfy him; and then gives us his own theory, which he supports with a great deal of impressive evidence. He argues his case well, and his incisive style of writing holds our attention throughout, even when we do not altogether agree with his views. This is a book that can be recommended to older readers who are interested in bird problems in general and particularly in what the author calls the "guilty secret" of the cuckoo.

"GREAT EASTERN LOCOMOTIVES PAST AND PRESENT"

By C. LANGLEY ALDRICH. 5/-

This book is Mr. Aldrich's third enlarged and up-to-date publication dealing with the locomotives of the former Great Eastern Railway. It is not a technical book, and is not just a collection of lists of numbers and dimensions, though naturally these items appear in the text. It has evidently been a labour of love, for the writer is confessedly a Great Eastern enthusiast and tells in a most interesting manner the story of the various classes of engines that have handled the traffic in East Anglia from 1862, when the Great Eastern as such came into being, until now. In addition to the purely Great Eastern types the L.N.E.R. "Sandringham" 4-6-0s are included, as they were introduced primarily for service on that section.

While Great Eastern locomotive practice was mostly conducted on sound conventional lines, the authorities were not slow to try out novelties in design or detail. Some of the earliest Moguls or 2-6-0s in this country ran on the line, compounding had a trial on it, and the Joy valve gear, at the time a recent invention, was given a turn. Later came the introduction of the Holden system of oil firing, used successfully on the line for some time, while power operation of the water scoop and reversing gear were also Stratford features. The enginemen benefited too by the installation of the special Enginemen's Dormitory at Stratford for the use of crews working up to town on "lodging turns," and another interesting item was the introduction in 1900 of the large side-window cab with extended roof, giving ample

protection to the enginemen, who, curiously enough, at first objected to this! But perhaps the most spectacular achievement for its time was the "Decapod" of 1902, the first British 10-coupled engine, built to champion the cause of steam against electric traction for suburban traffic.

With the stories of these developments we have entertaining anecdotes about various classes and there are several personal recollections of this engine and that, just the kind of happy little experiences that are exchanged when railway enthusiasts get together. The nicknames of different classes are not forgotten, and so we read of the "Little Sharpies," the "Gobblers," the "Ironclads" and the "Humpty Dumpties." The finish of Great Eastern engines, especially the splendid Royal blue livery and the much polished metalwork of the palmy pre-1914

days, has special attention, and there are a list of Locomotive Superintendents, a useful table of dimensions, and a summary of Great Eastern locomotive stock as it was when absorption into the L.N.E.R. took place.

With its numerous well-reproduced illustrations the book is an excellent addition to the library of any railway enthusiast. It can be obtained, price 5/4 post free, from the Locomotive Publishing Co. Ltd., 88, Horseferry Road, London S.W., or from the author himself, at 104, Grove Crescent, Kingsbury, London N.W.9.

"EXAMPLES IN ENGINEERING DRAWING"

By H. BINNS

(English Universities Press. 6/- net)

This is a book that can be well recommended to readers of the "M.M." who are beginning engineering courses in Technical Schools. It provides excellent drawing examples, the sketches for which are taken from actual parts of machine tools, engines and aeroplanes, and there are two sets, so that those who repeat the course covered will be given variety. Besides the actual examples there are practical details of the materials required and the use and care of instruments, with useful notes on printing, the types of line required for various purposes, the joining of curves and spacing out. These practical points are well illustrated by means of full page drawings, and the sketches of the various sections are full and clear.

"WAR PLANES OF THE NATIONS"

By WILLIAM WINTER (Harrap. 15/- net)

Here is yet another aircraft recognition book. It deals with British, American, Russian, French, German, Italian and Japanese military aircraft, and is the result of many talks with pilots, designers, representatives of various Governments in exile, and manufacturers' representatives. A book of this kind can easily get out of bounds, and the present one has been limited very wisely to those nations whose military aircraft have been made specially important by the events of the present war. Even with this restriction the volume deals with nearly 300 aircraft.

The author's aim has been to make the reading matter complete, yet interesting and enjoyable, by omitting technical data from the descriptions of the aircraft and summarising it in a brief specification at the end of each write-up. Good illustrations of most of the machines dealt with are included.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.



The Cargo and Passenger Motorship "Travancore." The photographs on this page are by courtesy of "The Shipbuilder and Marine Engine-BUILDER."

Sea and Shipping Notes

More New Swedish Motorships

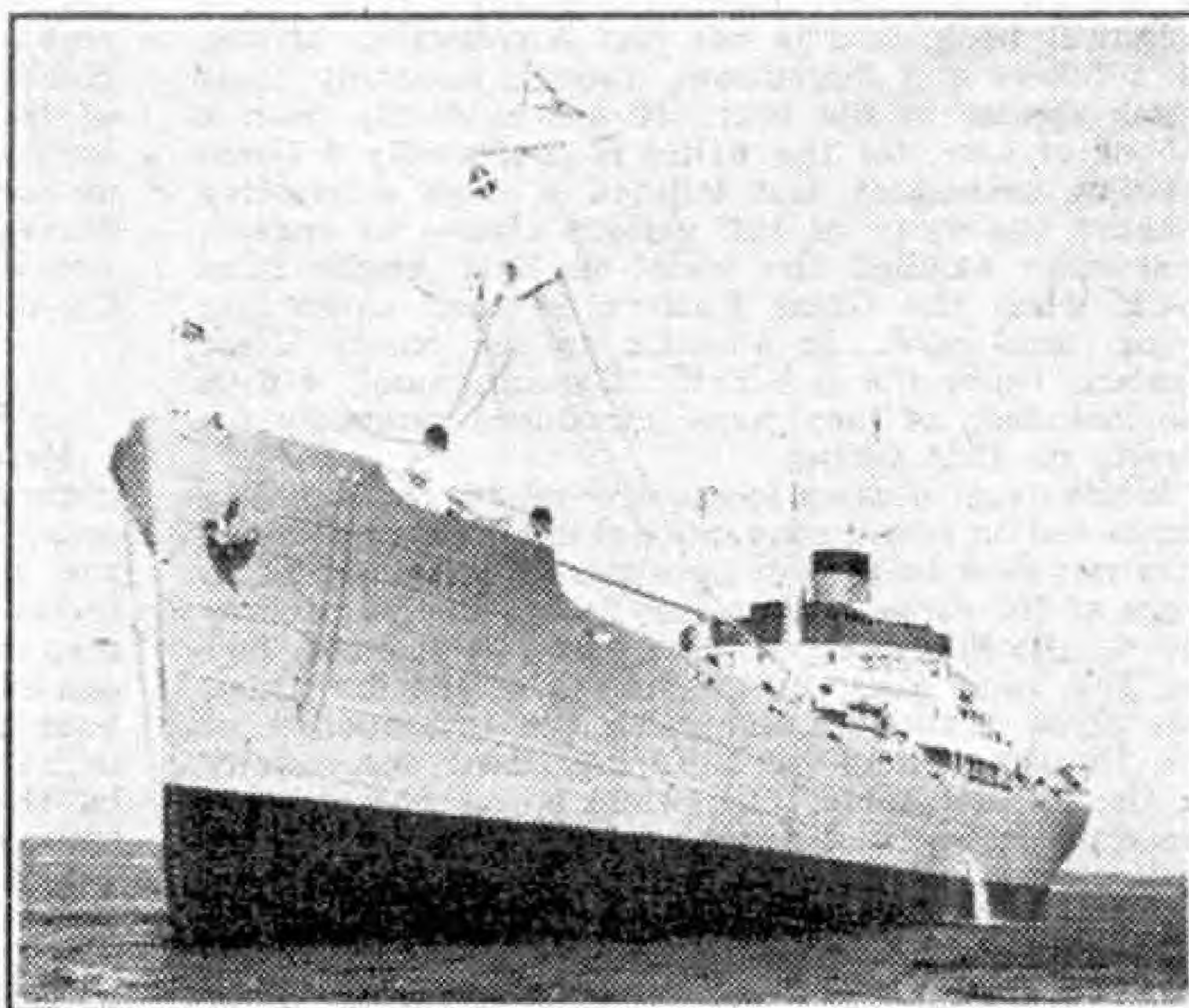
Two motorships completed and delivered last year by the Swedish shipbuilding firm Aktiebolaget Götaverken, of Gothenburg, are shown on this page. The vessel above is the cargo and passenger carrying "Travancore" built for the Swedish East Asiatic Co. Ltd., and put into service as a hospital ship of the Red Cross organisation. The propelling machinery consists of a single-acting two-stroke cycle Diesel engine of a new Götaverken design, capable of developing 6,400 I.H.P. at 102 r.p.m., and giving the ship, fully loaded, a speed of 16 knots.

The other motorship illustrated is the single-screw cargo vessel "Saivo," built to the highest class of Lloyd's Register of Shipping. She is the seventh of 12 ships ordered by the Grangesberg Company, of Stockholm, to cover losses sustained during the war, and in fact is the 20th turned out by the Götaverken shipyard for this company. The "Saivo" is of about 9,000 tons deadweight, and is equipped with a similar engine to that of the "Travancore," but developing 9,200 I.H.P. at 112 r.p.m. She has a speed of slightly under fourteen knots.

For the information regarding these ships we are indebted to "The Shipbuilder and Marine Engine-BUILDER."

Largest British Battleship Launched

The largest battleship ever built in the British Isles was launched recently from a Northern shipyard by H.R.H. Princess Elizabeth. Details of this great vessel are secret, but when completed she will be the most powerful warship in the world. The chairman of the shipbuilding company stated that the ship will be equipped with "electric eyes" able to penetrate darkness or the thickest fog to detect unerringly the position, speed, and the course of enemy warships.



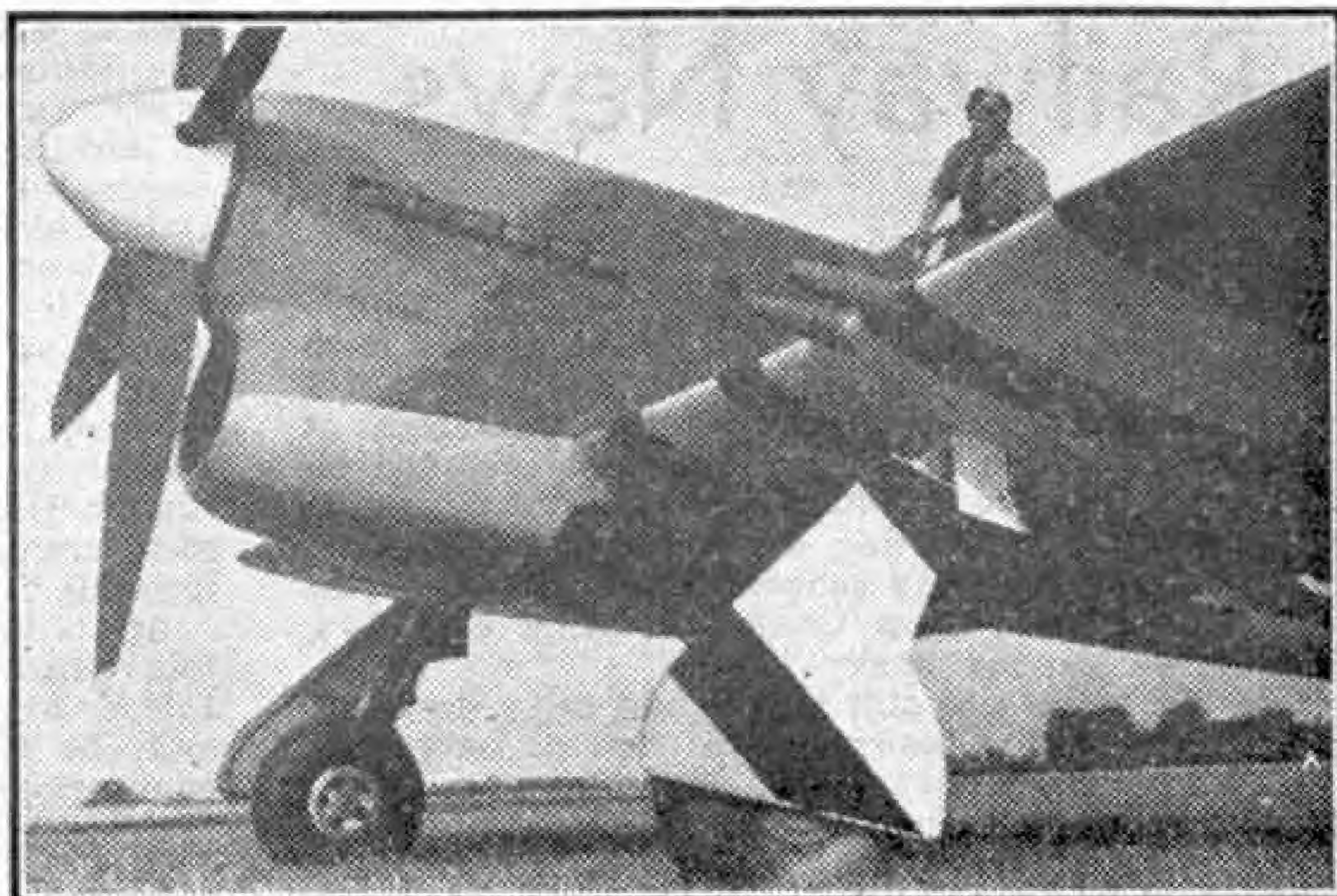
The Cargo Motorship "Saivo."

The Hawker "Tempest"

By John W. R. Taylor

HAWKER single-seat fighters have formed the spearhead of R.A.F. Fighter Command's attack in every battle and on every battle-front during the last five years. The achievements of the "Hurricane" and "Typhoon" have passed into history, but although these fighters will continue to devastate and dismay the enemies of Britain until complete victory has been assured, a new and more terrible wind has arisen to sweep the Luftwaffe from the skies—the "Tempest."

Back in 1942, Hawkers started work on an experimental "Typhoon" Mark II with a new "thin" wing that they had evolved. This wing was elliptical in plan form and of the "laminar-flow" type, which ensures high lift combined with low drag. The new machine was very similar to the "Typhoon" Mark I. It was decided



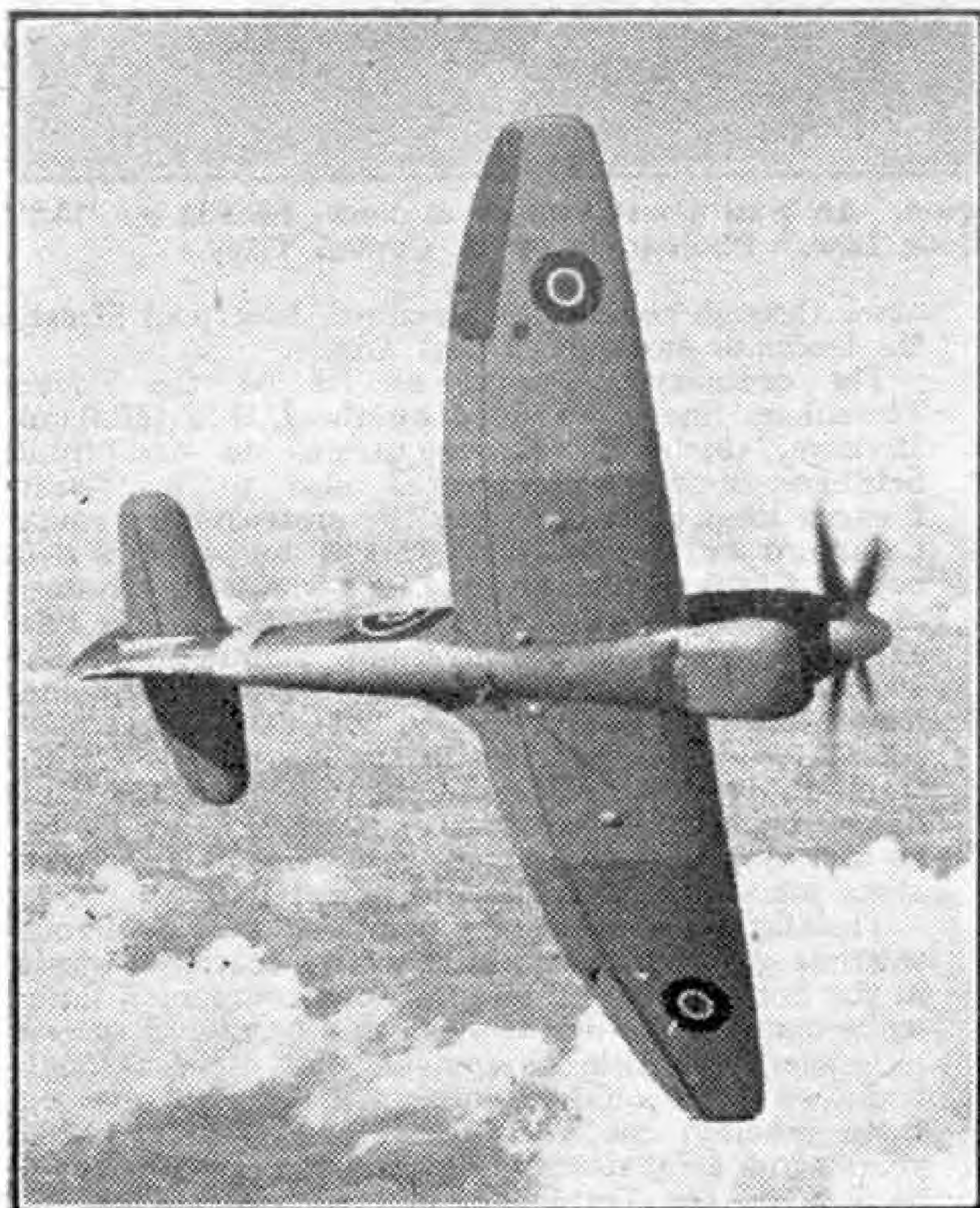
The Hawker "Tempest" single-seat fighter at close quarters. Photographs by courtesy of Hawker Aircraft Ltd.

to give it a fresh name, however, and so the "Tempest" was born.

From the start the "Tempest" was a world-beater and proved surprisingly free from the almost inevitable "teething troubles" that haunt most new aircraft. It was one of the fastest single-seat fighters in the world, but speed was not achieved at the expense of controllability, and the "Tempest" set a new standard for lightness of control and manoeuvrability. This is all-important in a fighter, for the pilot who has to concentrate all the time on keeping his aircraft right way up has very little future in present-day aerial warfare.

The "Tempest" first hit the headlines during the flying-bomb attack on London, when it became the ace "Doodlebuster" of Air Defence of Great Britain. Nearly 650 flying-bombs were destroyed by Wing-Commander Beaumont's "Tempest" wing, 60 of them falling to one pilot, Squadron-Leader J. Berry, D.F.C. Incidentally 57 of his victories were achieved in night actions. But before the new Hawker fighters were diverted for this vital task, the Hun had already been introduced to them over the Continent, where they left behind their "visiting cards" in the shape of the shattered remains of more than 100 railway engines and several Focke-Wulfs—a reminder that the "Tempests" would be back again.

Now they are back again—right up with the forward troops in Holland. In October last year the "Tempest" went into action for the first time against a Messerschmitt 262, the Hun's new jet-propelled fighter, with the result that the Luftwaffe was very soon minus one aircraft.



The plan form of the wings is shown to advantage in this striking underside view.

Railway News

A Good Darlington-York Run

In the second of Mr. Weight's "*Remarkable Runs*" articles, in the "*M.M.*" of April 1944, details were given of a splendid performance by an "A3" 4-6-2 over the 44 easily graded miles between stops at Darlington and York. A note was also included on the early history of rapid travel along that section of the L.N.E.R. main line, as well as a reference to the fast times regularly scheduled and achieved just before the war by East Coast and other expresses, which often carried heavy loads.

Now the trains are still longer and more crowded, but the timings are easier, as instructions have been given to enginemen to restrain maximum speeds and to economise with fuel. The coal loaded on the tenders in advanced wartime conditions is not always of the high quality that would be insisted on in peace conditions, however, while on account of hard user as well as depleted shed staffs, the locomotives, on all lines, sometimes are not in the best of trim. Yet along this main route between Newcastle and King's Cross they have bravely been tackling 20-coach loads for some years.

Since last winter a maximum has been adhered to if possible of 18 corridors, though that may represent as much as 620 tons behind the tender, including passengers, luggage and equipment.

Not long ago a southbound Sunday express was running in two parts, the second portion consisting of 17 coaches, weighing about 580 tons full, hauled by "A3" No. 2752 "*Spion Kop*." There had been 5 min. delay at Darlington on account of heavy traffic, but a good recovery effort ensued. Northallerton, 14 miles, was passed in 18½ min. at 67 m.p.h.; then 24½ miles, mainly level or slightly falling, were covered in 21 min. by dint of steady 70 m.p.h. travel, thus enabling a stop to be effected at York a half-minute before time in 46½ min. compared with the 52 now allowed. After smart station work, the train was halted at the next stop, Selby, 3½ min. early by advertised times. Despite the tough conditions of the fifth year of war, No. 2752 appeared able so to continue, but adverse signals plus a diversion to the slow line caused too much delay afterwards to allow of a punctual arrival at Grantham or Peterborough.

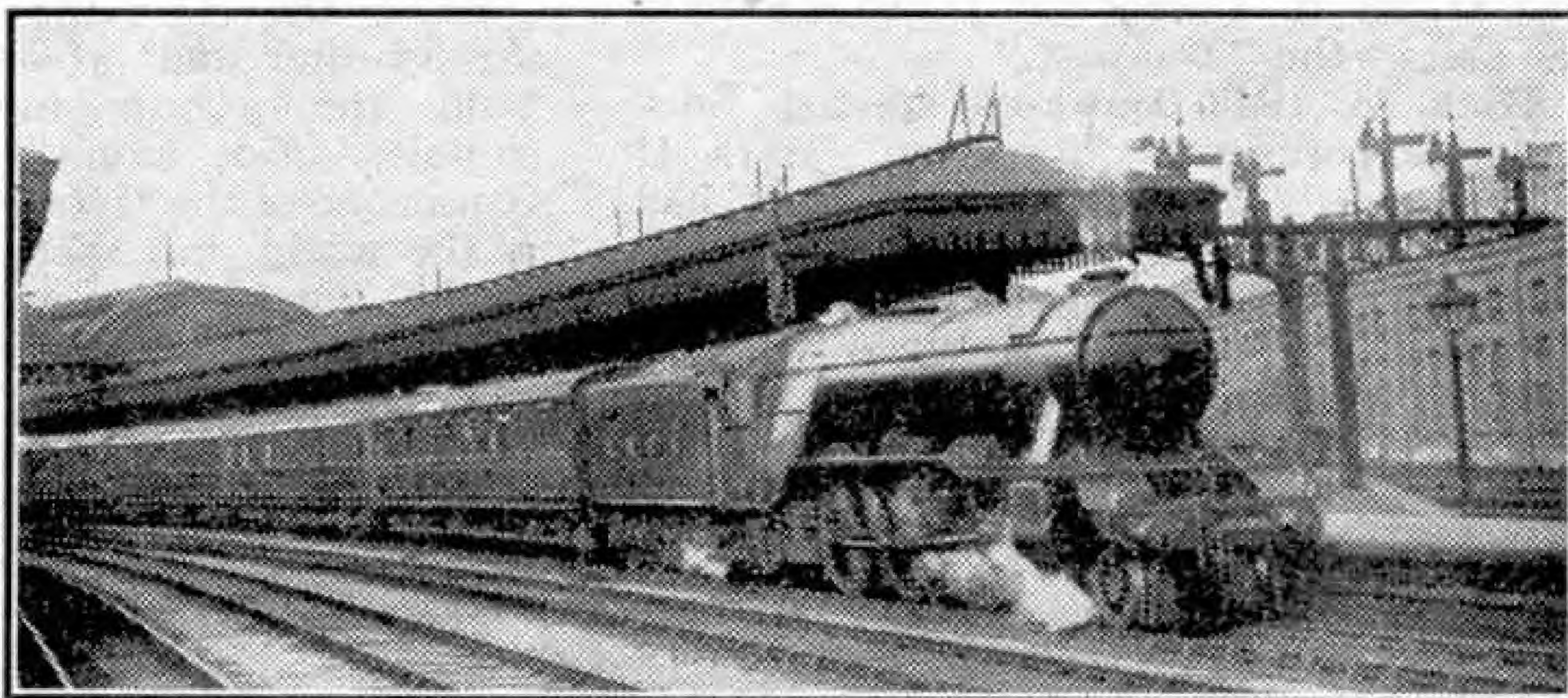
Junction Railways in North London

Continuing our short surveys of the interesting connecting-link railways round London, we turn now to those running approximately from north-west to north-east. From the West London and from the North and South-West Junction Railways already described there is direct access by way of Willesden, High Level, to the Hampstead Junction line of the L.M.S., formerly London and North-Western-North London, over which runs the electrified suburban service previously mentioned between Richmond S.R. and Broad St., L.M.S., using the one-time North London metals east of Camden Town.

Through working is possible via Hampstead Heath and Camden Town from the Southern, Great Western and L.M.S. (Western Division) systems to the G.N.

and G.E. sections of the L.N.E.R., or L.M.S. (Midland) lines as well as to the Docks; certain connecting spurs are normally used for interchange freight trips only, others for special through passenger or other working in addition, as necessary, thus providing varieties of locomotives and rolling stock. A junction at Gospel Oak, which is close to the elevated open space, with fine views over London, known as Parliament Hill, leads directly from the Hampstead Junction to an interesting series of eastbound lines, of which the main stem is the Tottenham and Hampstead Joint railway, owned by the L.M.S. and L.N.E.R. and staffed by both under a joint agreement. As far as Crouch Hill the station buildings, signals, and equipment are of typical Midland type; on to S. Tottenham it is all "Great Eastern" in appearance.

At its inner London end this connecting link also joins directly with the Midland main line of the L.M.S. from the north, as well as from St. Pancras and the Metropolitan section, with its underground connections to and from the Southern system. Near Haringay there is a goods branch up to the L.N.E.R. East Coast main line. After receiving a connection from the former Great Eastern Enfield and Palace Gates suburban branches, at Tottenham the T. and H. ends by forking into three other routes, to East Ham, Tilbury and Southend, L.M.S., to the L.N.E.R. Cambridge main line northward, and to the same Great Eastern route southward respectively. These



After a fast run from Darlington. An East Coast express at York, headed by "A3" 4-6-2 No. 2599 "*Book Law*." Photograph by H. Gordon Tidey.

allow through running to Stratford, Liverpool Street, the Docks or any part of East Anglia.

The ordinary passenger service on the South Tottenham line is provided by the L.M.S. (Midland Division), including through trains to and from Southend-on-Sea. There used also to be Great Eastern local trains covering the cross-country route Chingford to Gospel Oak, worked by small 0-6-0 or 0-4-4 tank engines hauling four-wheeled set trains, as well as some of that Company's Cambridge line expresses, including Royal trains, running into St. Pancras by means of running powers over the Midland from Kentish Town, instead of using Liverpool Street terminus. Apart from specials, the L.N.E.R. traffic to-day is all of the freight type along the joint line, being worked like that of the L.M.S. by tender as well as tank locomotives. S.R. engines also come along sometimes, including the new "Q1s."

The starting and finishing points of these numerous wartime goods trains include widely scattered yards in the London area on all four main companies' lines, while many interesting stories could be told of special passenger, livestock, equipment, and other through trains on cross-country journeys that have traversed these junction routes in peace and war. Over 30 years ago a good selection of locomotive colours could be seen on the Tottenham and Hampstead line, as there were the blue of the Great Eastern, the crimson of the Midland and the green of the London, Tilbury and Southend.



The West Coast "Scotsman" climbing Shap, with 15 corridors and three vans behind the engine, "Princess Royal" Class "Pacific" No. 6201 "Princess Elizabeth." Photograph by Rev. E. Treacy.

W.D. Locomotive Notes

The adding of 70,000 to the numbers of British W.D. locomotives, first reported last month, has become more general, not only on the "Austerity" 2-8-0 and 2-10-0 engines, but also on a number of those taken over by the Ministry of Supply from the G.W.R., S.R., and elsewhere which had previously been renumbered in W.D. lists. There are now 2-8-0s built by the Vulcan Foundry Ltd., numbered 787xx and 791xx. Construction of various series also continues at the works of the North British Locomotive Company. Many locomotives of this type are now allotted to the Great Western, including a good many previously on other British lines. All the American-built 2-8-0s appear to have been withdrawn for service overseas, and we understand that the same applies to most of the W.D. British 2-10-0 engines that had been working here on loan.

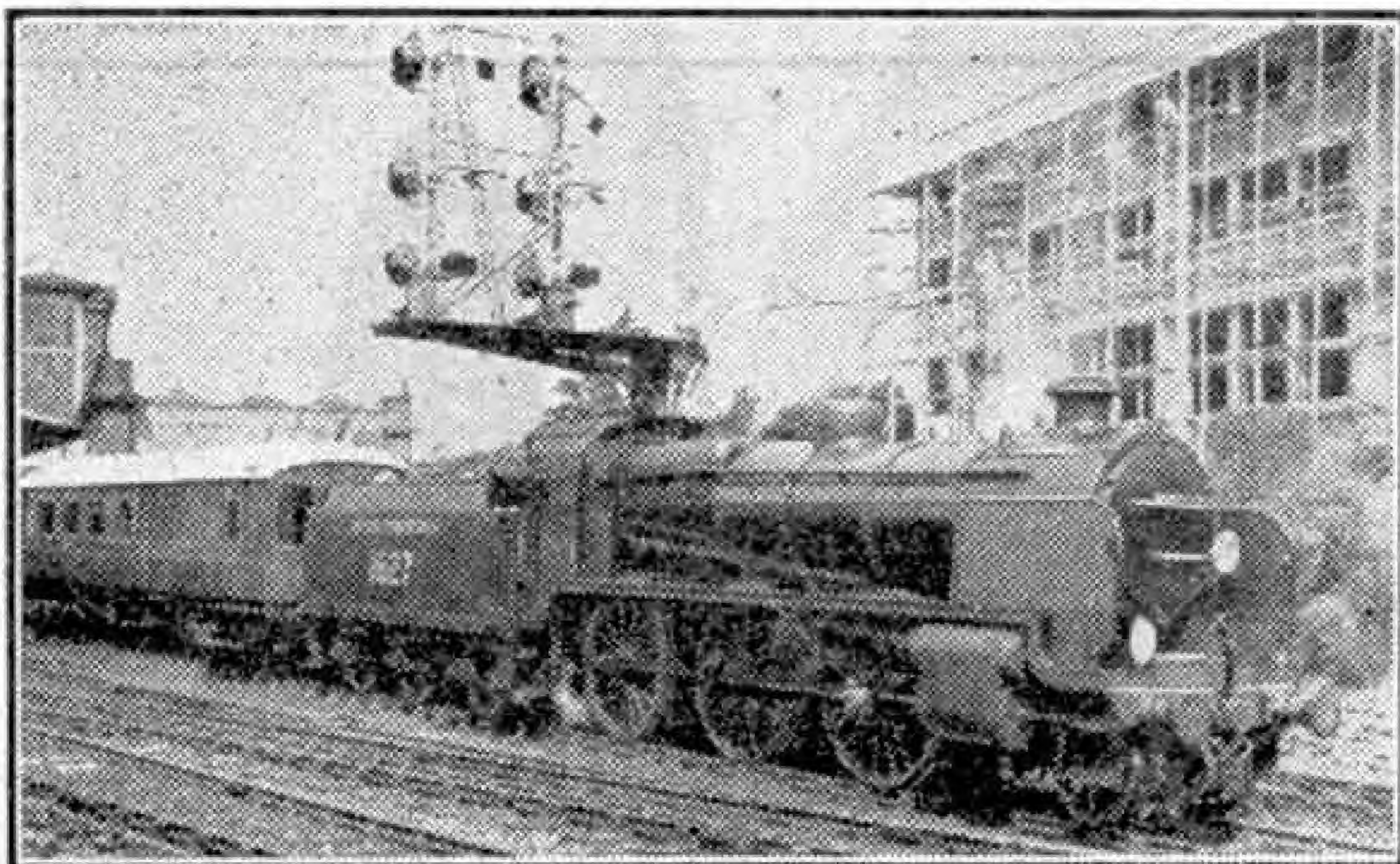
L.M.S. Tidings

No. 27505, the diminutive 64-year old ex-North London 0-6-0 tank described in the October 1944 issue, was seen in September running quite well as a light engine on the Midland Division fast line not far from St. Pancras. No. 6252, the latest "Pacific" reported, was named "City of Leicester" at that city on 9th October last, and so travelled over the Midland line, as have several others of the "Princess Coronation" class in connection with naming ceremonies. Further new 48xx class "5" mixed traffic 4-6-0s are at work.

A considerable exchange of 2-6-4Ts, both taper and parallel boiler types, has been taking place between English and Scottish sheds. No. 6202, the "Turbo-motive" 4-6-2, has returned to Camden shed, London, after repair, painted black but apparently otherwise unaltered. More class "8F" Stanier 2-8-0 engines continue to appear from various works in different parts of Britain. Although essentially designed for heavy freight duty, with driving wheels only 4 ft. 8½ in. diameter, they are being used to a considerable extent in Scotland for hauling main line passenger trains between Glasgow, Perth, Aberdeen and elsewhere, taking up to 14 corridor coaches and so avoiding a good deal of double-heading, as present schedules over such difficultly graded routes demand power rather than speed along most stretches. Engines of this type are also seen sometimes on special passenger trains in England, thus demonstrating their versatility.

It is reported that a new series of 2-6-4 tank locomotives is to be built at Derby, starting with No. 2673, and that they will be 3-cyl. compounds! Presumably the cylinder arrangement would be similar to that employed on the 4-4-0s modified from the famous Midland design. There are now in service 37 three-cyl. simple 2-6-4Ts, built mainly for the London, Tilbury and Southend section, and over 300 2-cyl. ones of the Fowler or Stanier types having that wheel arrangement.

No. 7947, a "7F" 0-8-4T, is the first of her series to be scrapped. Although an L.N.W. design, she was constructed after the L.M.S. had come into being as one of a batch of 30, with 4 ft. 5½ in. driving wheels, for heavy mixed traffic duty in the Midlands, such as between Manchester and Buxton, in South Wales and in the Liverpool district. Another member of a once-famous glossy black class, now decimated, that has been listed for withdrawal is No. 25751, a "Prince of Wales" 6 ft. 3 in. 4-6-0; the same may more or less be said of No. 12771, of the Lancashire and Yorkshire 0-8-0 freight type that dates back to 1901. Further Scottish withdrawals from the erstwhile green Highland Railway locomotive stock include "3P" No. 14689 "Cluny Castle," of the first 4-6-0 passenger class produced in 1900, with outside cylinders; another of the much newer and more powerful "Clans," 4-6-0 No. 14763 "Clan Fraser," similar to the one illustrated in the "M.M." in June last; and "2P" No. 14405, of the inside cylinder 4-4-0 "Small Ben" type, named "Ben Rinnes."



A through train to the L.N.E.R. leaving Bournemouth, hauled by "U" Class 2-6-0 No. 1627. Photograph by G. O. P. Pearce.

New U.S. Army Glider

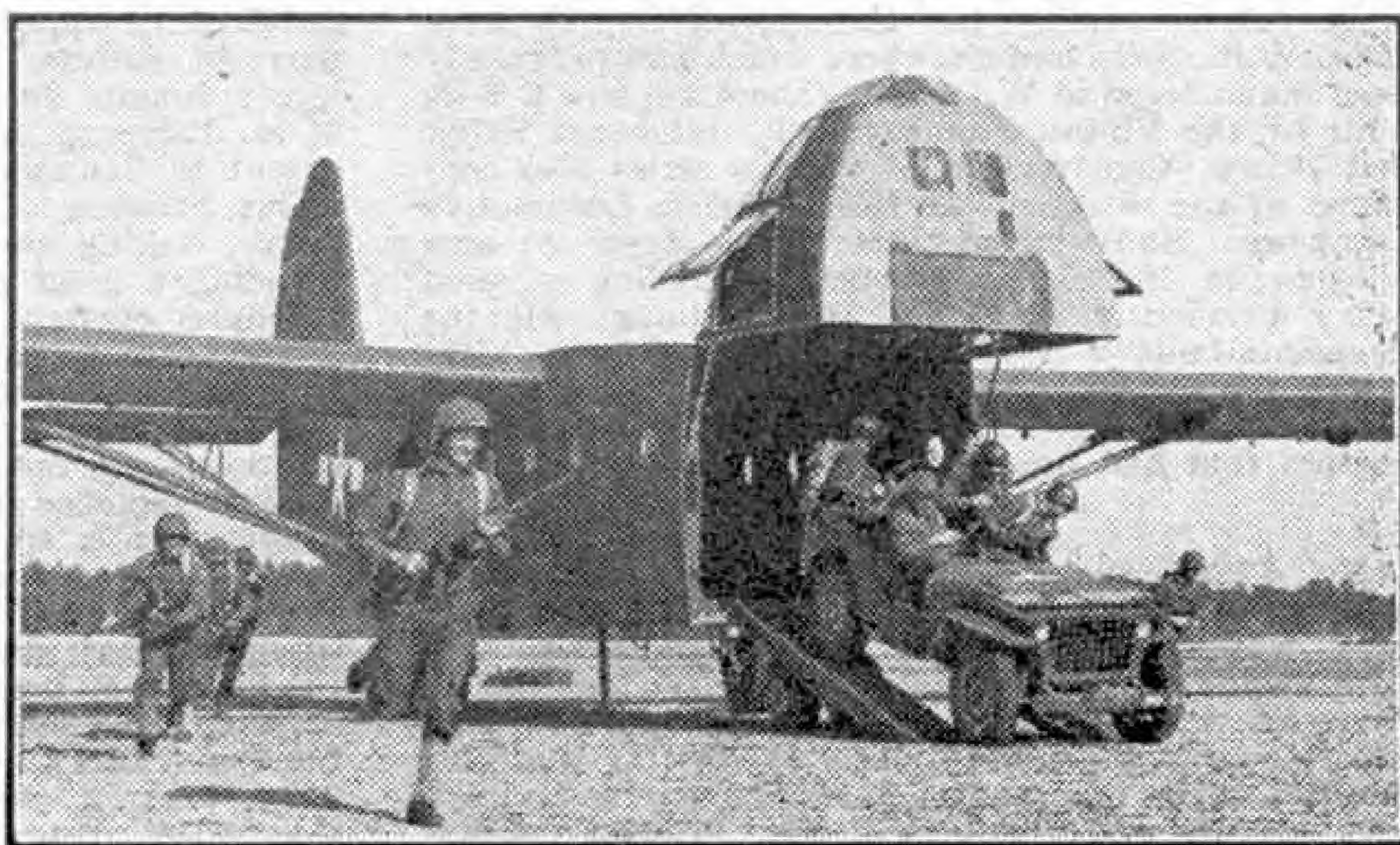
Waco Type Transport that Carries 30 Fully Armed Troops



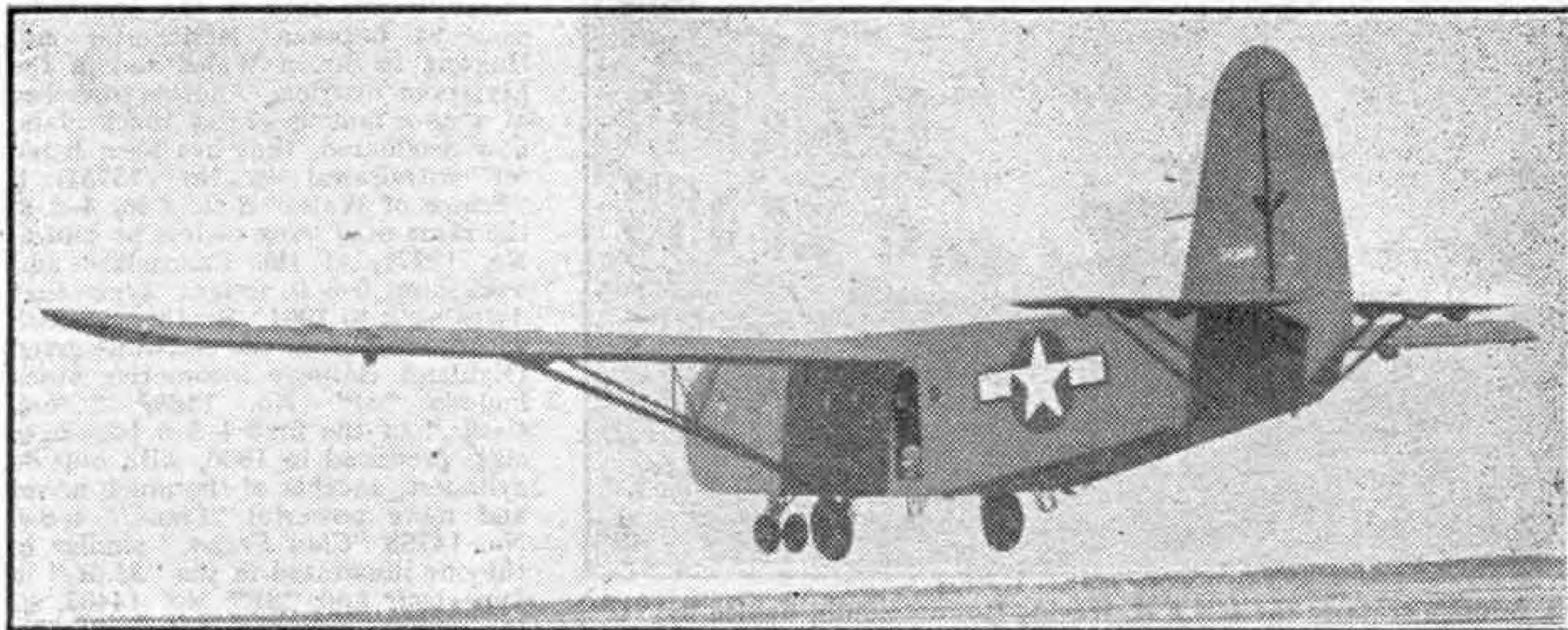
The big American Waco CG-13A troop and cargo-carrying glider, illustrated here and now in service with the U.S.A.A.F., can carry 30 fully armed soldiers and their equipment, or several tons of freight and supplies. It has a wing span of 85 ft. 6 $\frac{3}{4}$ in., a length of 54 ft. 2 $\frac{1}{4}$ in., and is the first U.S. Army glider to have a tricycle undercarriage.

The CG-13A is the latest addition to the series of Waco gliders that began with the CG-3, an 8-seater troop transport.

A Waco CG-13A glider of the U.S. Army's First Troop Carrier Command. The long, braced wings and the broad, squat nose of the box-like fuselage are well shown.



Demonstrating the size and cargo capacity of the CG-13A troops pour from the big glider, some of them already in a jeep.



The take-off. One of the new Waco gliders just after leaving the ground, behind its tow-plane.

Exploring Alum Pot

A Strange Underground World

By F. H. North

CAVES and pot-holes abound in the Craven district of Yorkshire and many interesting hours can be spent finding them and afterwards climbing down as far as possible. The writer has visited many of them, and was able with the aid of a few friends to make a very interesting expedition down Alum Pot, on the slopes of Ingleborough. This is surrounded by trees and a limestone wall and looks like a large disused stone quarry. Clinging to a tree we looked down into its lower reaches and watched a stream drop noisily into it and out of sight. We then pushed on up the hill to the middle entrance of Long Churn Cave, from which there is an underground route to the Pot.

Long Churn Cave, which starts higher up the fell, comes close to the surface here, and we were able to climb down into the stream passing through it, which everyone agreed was very cold. We switched on our electric torches, picked up our ropes and rope ladders and made our way downstream towards the Pot. We were only able to move very slowly at first, but soon our eyes became accustomed to the darkness and our lights seemed like miniature search-lights. We waded downstream, coming across many deep pools that we had to skirt carefully to avoid getting very wet. The roof was from 6 ft. to 18 ft. high, so we had plenty of head room. After about 15 minutes we were able to branch off the main water passage into an old stream bed that is now dry.

The first members now took a flashlight photograph while the rest of the party scrambled on. Suddenly one of the members let out a yell. We found that he had stepped on to what appeared to be a rock in the middle of a pool, but the water was so clear that what looked like 3 in. of water was actually 3 ft., and consequently he had plunged up to the waist in ice cold water. He and a companion made their way back to the surface to wash and change.

After the rest of the party had safely scrambled round this innocent-looking but deceptive pool we arrived in a large cavern, and as some of the party said they could see daylight our lamps were switched off. Sure enough we could see a faint light ahead, but when we moved towards it we found that a stream along which we were now moving passed through two deep pools and then fell sheer for about 50 ft. We fixed up a rope ladder and after tying a life-line round one of our men the large pools were emptied and before they could fill up again the man climbed down the ladder with the rest of the party paying out the life-line, which at a shout from below was quickly drawn up. Our other ladders and gear were dropped down and photographs were taken while other members were climbing down.

After negotiating the ladders we all gathered in

the subdued daylight and found that the end of our cave was about half way down the Pot, up which we were able to see the trees and sky far above. Immediately in front of our cave mouth water was dropping down on to a sort of broad ledge about 15 ft. below. Further along we could see a large rock, bridging the gap between the two walls. Water was also falling at the far end, and a ledge could

be seen on our right leading to the large rock forming the bridge.

On our left was a drop of about 100 ft. to the lower reaches, and 150 ft. above were the trees and a few curious onlookers. We took a photograph looking back at the cave mouth, and after climbing down the side of the rock bridge we used our second rope ladder for a further drop of 60ft.

This pitch is in daylight and it is not necessary to climb down in a hurry. The ladder hangs clear of the rock and some of our party spun round owing to its not being fixed at the bottom; the life-line is a real comfort at this stage. Many fine views of the Pot are obtained here. Shafts of sunlight find their way down, and the stream can be seen far below, while a waterfall to one side drops with considerable force.

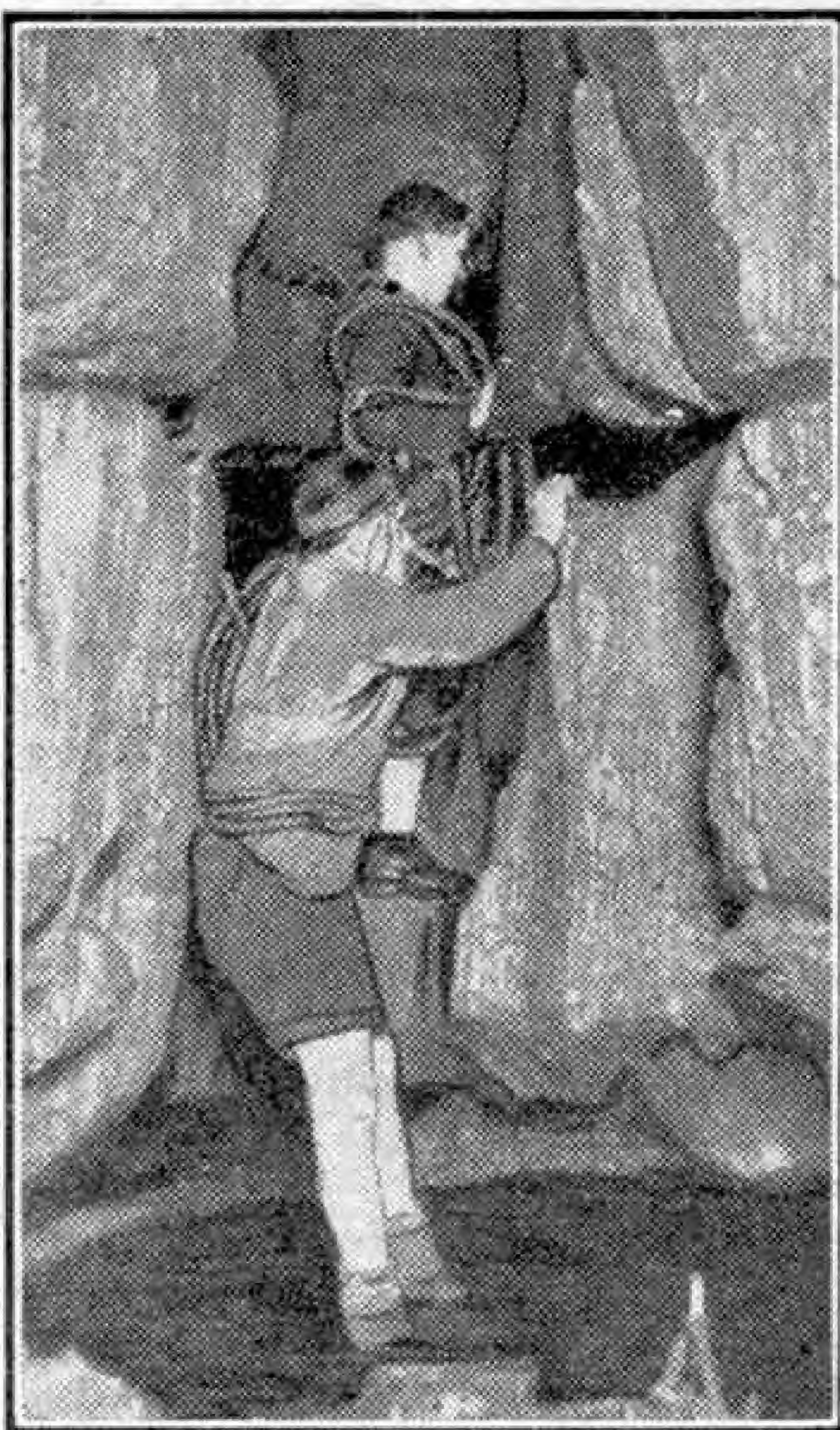
Near the bottom of the ladder, splashes from the fall encouraged one to proceed quickly to a lower level, and from a drier place one is able to watch the next man come safely down.

A ladder was then carried along to the last vertical drop and the first member of our party was sent down. It was now necessary for us to switch on our lights, and although

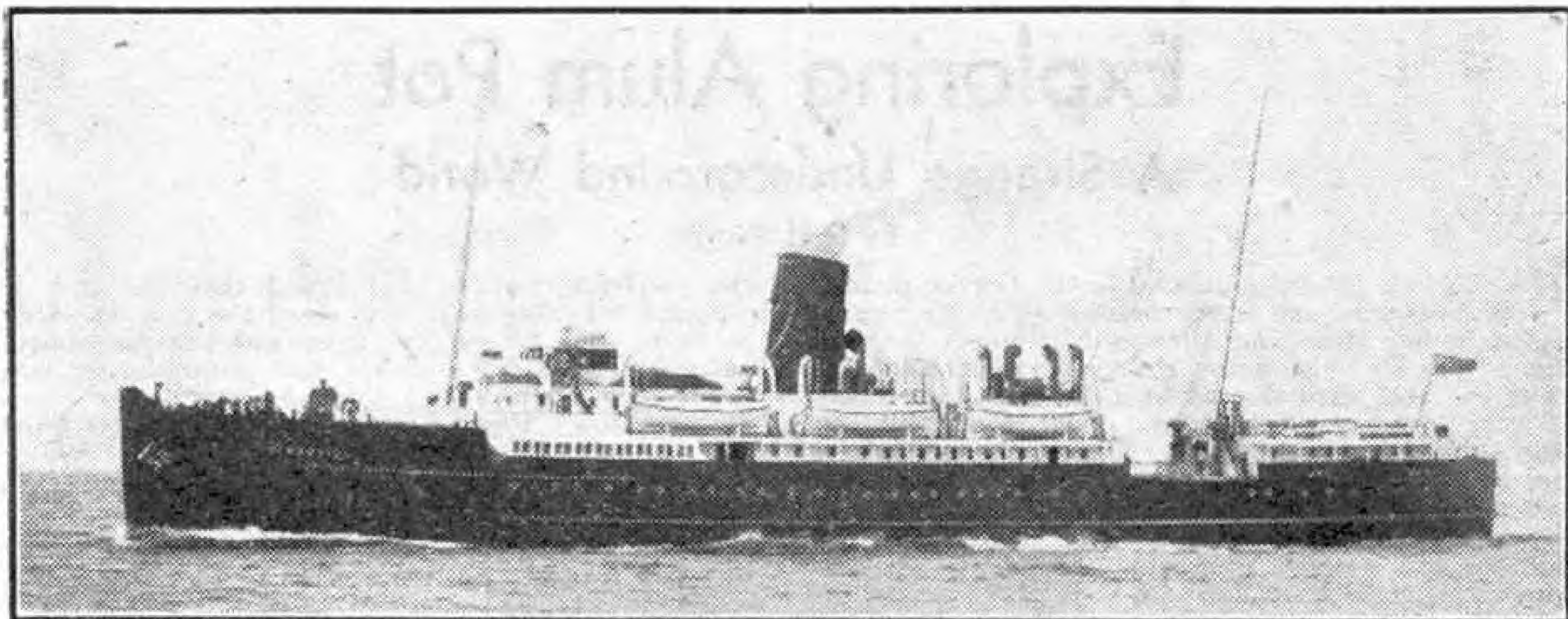
our lamps could not reach the roof we plunged lower and lower still, following the cold stream, now about 4 ft. deep in places. After about 15 minutes we noticed another waterfall coming from the roof of the cave and the water from this joined our stream, which finally ran into a large pool that seemed to be about 3 ft. deep. Though a considerable amount of water is running into it day and night its level keeps almost constant, and the water seeps rapidly away, possibly through some form of syphon.

So far as is known, the exploration of the Pot ends here, which is something of an anticlimax, as everyone would have liked to follow the stream to the daylight again. It has been found by colouring the water that the outlet is at the other side of the valley some three miles away, so the water must go underground below the River Ribbles, to reappear at a similar level to Alum Pot. The passage is probably full of water so it is most unlikely that anyone will be able to explore it.

From this pool we all had to return to the surface by the same route, pulling up ladders and ropes as we climbed out. We had been underground five hours.



At the foot of a 20 ft. drop underground, on the way to Alum Pot from Long Churn Cave on the slopes of Ingleborough.



The G.W.R. Cross-Channel passenger steamer "St. Patrick." Photograph by courtesy of the G.W.R.

British Railway Steamers in the War

A Fine Record

SINCE the outbreak of war 92 British Railways' steamers have been chartered to the Government at varying periods, as hospital carriers, transports, assault ships, minelayers and sweepers, ammunition carriers, ack-ack ships and rescue ships with Atlantic convoys; and 23 have been lost by enemy action. Certain of the vessels fly the White Ensign and run directly under the control of the British Navy; while others are still manned by their peace-time crews, many of whom, both officers and ratings, have received awards for gallantry at sea.

The first American troops from Ireland to this country were brought on an S.R. steamer, while vessels of all four companies played their part at Dunkirk, in which operation some eight were lost. An L.M.S. steamer was the last merchant ship to leave Dunkirk.

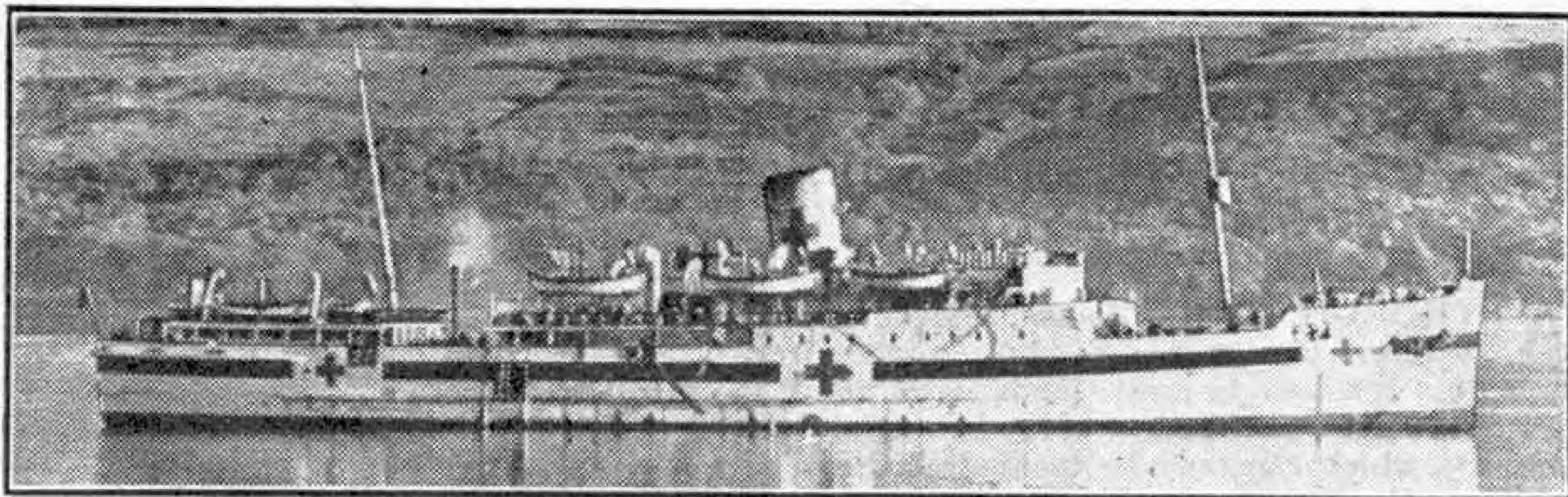
A famous G.W.R. steamer, the "*St. Patrick*," was sunk by enemy air attack on 13th June 1941, while on her ordinary passage from Ireland to England. The master, 17 of the crew and 12 passengers lost their lives. The vessel was nearing the end of her voyage from Rosslare to Fishguard Harbour, when she was attacked and hit by several bombs. She sank in a few minutes, so quickly that there was little chance of lowering the boats, and many of her complement were killed in the explosion. The crew numbered 45 and there were 44 passengers. Most of the passengers were asleep at the time, but all the women and children among them

were rescued, several of them owing their lives to the gallantry of men who, jeopardising their own chances of safety, searched for them in the heavy sea and dragged them to rafts that had been hastily thrown overboard as the steamer began to sink. Of the ship's crew, 18 lost their lives, including the master, J. Faraday, the chief officer, the second officer, a stewardess and 13 others, as well as a Traffic Department ticket-collector.

The "*St. Patrick*" was built and engined by Alexander Stephen and Sons Ltd., of Govan, Glasgow; in 1930.

Another G.W.R. steamer, the "*St. David*," employed as a hospital carrier, was bombed and sunk off Anzio Beach on 24th January 1944, the master and 12 of the crew losing their lives, apart from many military casualties.

The "*St. David*" had embarked a number of casualties from the Anzio beaches, and in company with two other hospital carriers, one being her sister ship the "*St. Andrew*," she was sailing southward after dusk with all hospital ship indications fully illuminated. The three vessels were singled out for a heavy aerial attack and suffered repeated bombings by Nazi planes. The "*St. David*" received a direct hit, which caused such vital damage that she sank within a few minutes. During the attack the "*St. Andrew*" received superficial damage and sustained a heavy shaking, but fortunately had no casualties among her crew. Together with help from the "*Leinster*" her crew succeeded in picking



The G.W.R. steamer "St. David" as a hospital carrier. Photograph by courtesy of the G.W.R.

up very many of the "St. David's" survivors, including Forces casualties and members of the ship's company.

In pre-war days the "St. David" was one of the steamships on the company's Fishguard-Rosslare route to Southern Ireland. She was requisitioned for Admiralty purposes in September 1939, and fitted out as a hospital carrier. She played a particularly active part in evacuating casualties from Dunkirk in May 1940. She was launched at Cammell Laird's shipyards in December 1931.

The s.s. "Autocarrier" of the Southern Railway, known in peace-time as the motorists' steamer, is now a Navy recreation ship, providing comforts, entertainments and recreation facilities to the various vessels of the Royal Navy. The three train-ferry vessels of the S.R., which enabled through sleeping cars to run between London and Paris, are at present

doing useful and interesting work elsewhere.

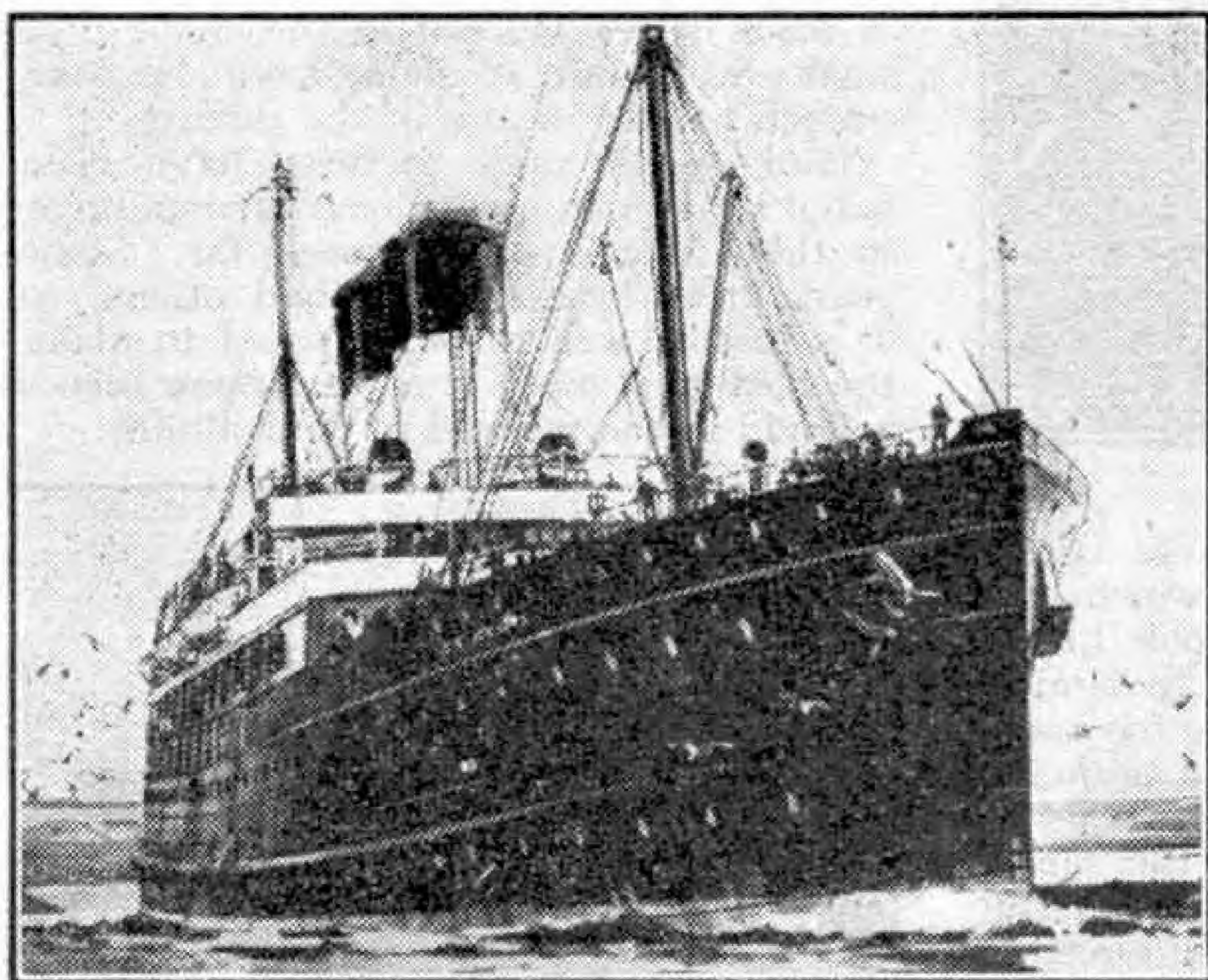
The G.W.R. cross-channel steamer "St. Helier," the L.M.S. Clyde steamer "Caledonia," and the Isle of Wight Southern steamer "Southsea," each has an enemy aircraft to its credit, while the L.M.S. Clyde boat "Queen Empress" has shot down two.

Nine L.M.S. Clyde steamers were fitted out as minesweepers and have done good work round the coast of Britain. Five of them rendered notable service in a similar capacity in the last war.

Several L.N.E.R. steamers performed outstanding service in bringing evacuees from Holland at the time of the German invasion. One well-known Harwich steamer, the "St. Denis," had to be scuttled and abandoned in Rotterdam. The crew, after great hardship, made their way to the Hook of Holland and returned to England in a British destroyer.

The L.N.E.R. cargo steamer "Sheringham" worked for a time in the Channel Islands services, while other L.N.E.R. vessels, the goods train ferries normally on the Harwich-Zeebrugge route, assisted in the Channel Islands evacuation. One of these vessels was lost in evacuating British troops from St. Valery. On the same occasion two G.W.R. cargo vessels narrowly escaped destruction, being badly damaged, while several of the crews were killed and others wounded.

When the whole story of the war work of the railway steamers can be told, it will provide a stirring picture of bravery and self-sacrifice.



The well-known L.N.E.R. steamer "St. Denis." Photograph by courtesy of the L.N.E.R.

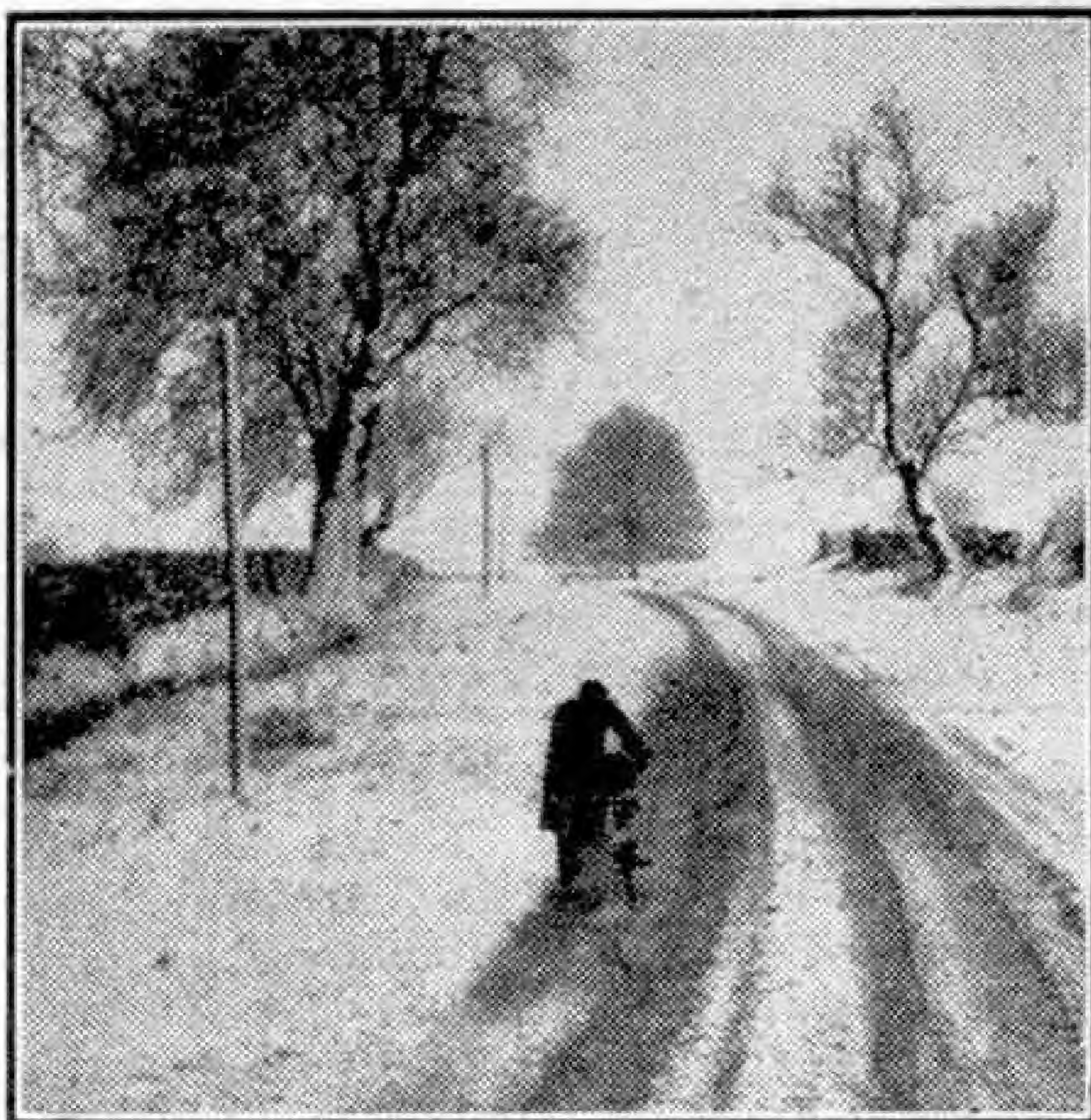
Photography

Snow and Frost Pictures

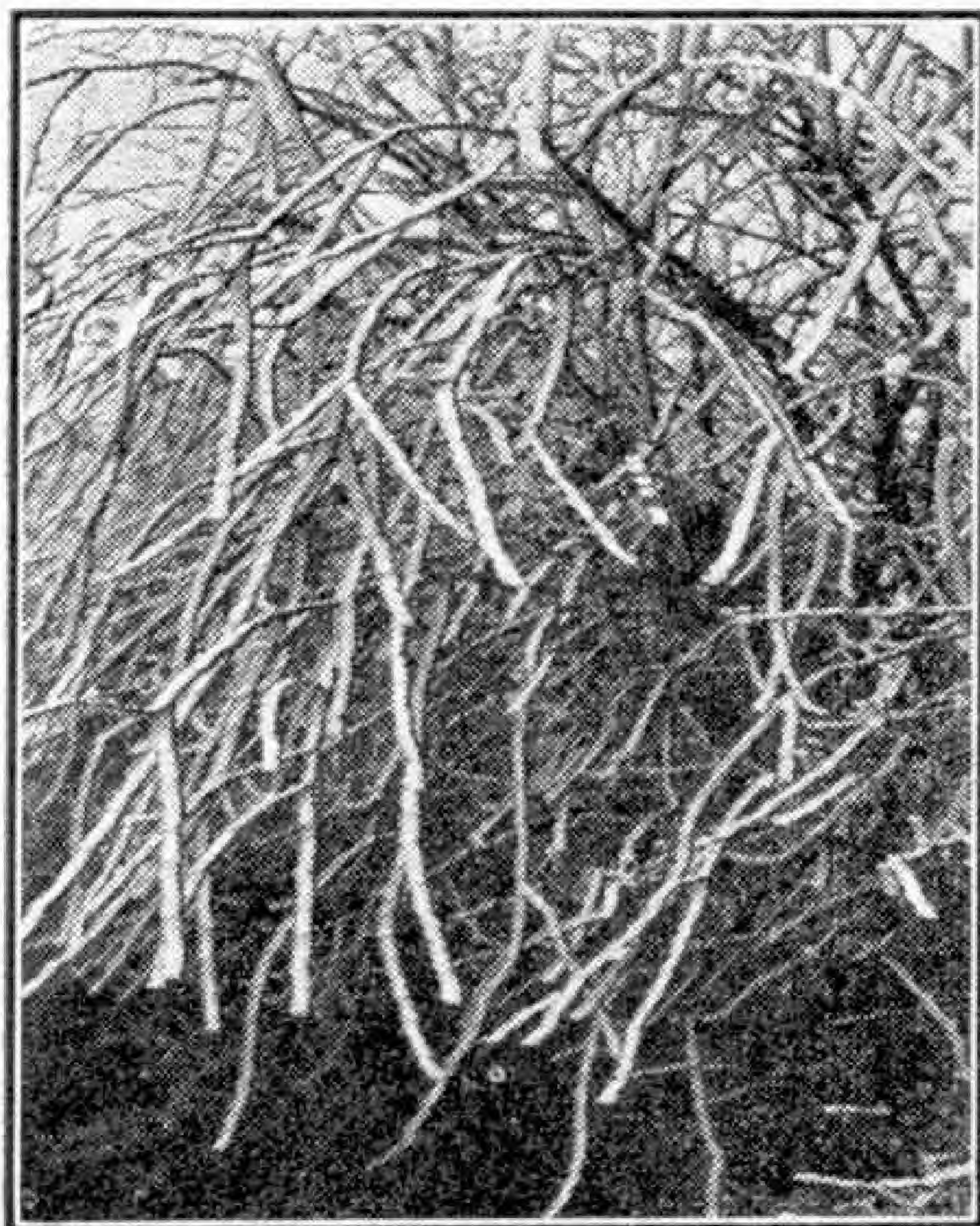
By E. E. Steele

ALTHOUGH in the darker days of Winter the amateur photographer feels less inclined to sally forth with his camera, there are some very beautiful subjects which can only be tackled at this season. The frost and the snow have the power of transforming the landscape overnight, and many subjects, not worth a shot in Summer, now become scenes of beauty and interest, and it is worth while to put up with a little discomfort in an effort to snap some of these pictures.

Sometimes we have many continuous hours of fog and frost, and the damp air,



Snow in the country.



Jack Frost's icy fingers.

freezing upon the twigs, gives those wonderful crystal-like effects which can make a common Rose-briar look like a work of art, as indeed it is. In similar weather last Winter, the freezing fog made fingers of ice upon the twigs and branches almost an inch thick. If you are able to take your photographs just as the sun is breaking through, you have a wonderful chance of getting some really interesting pictures.

As the light is poor at this time of the

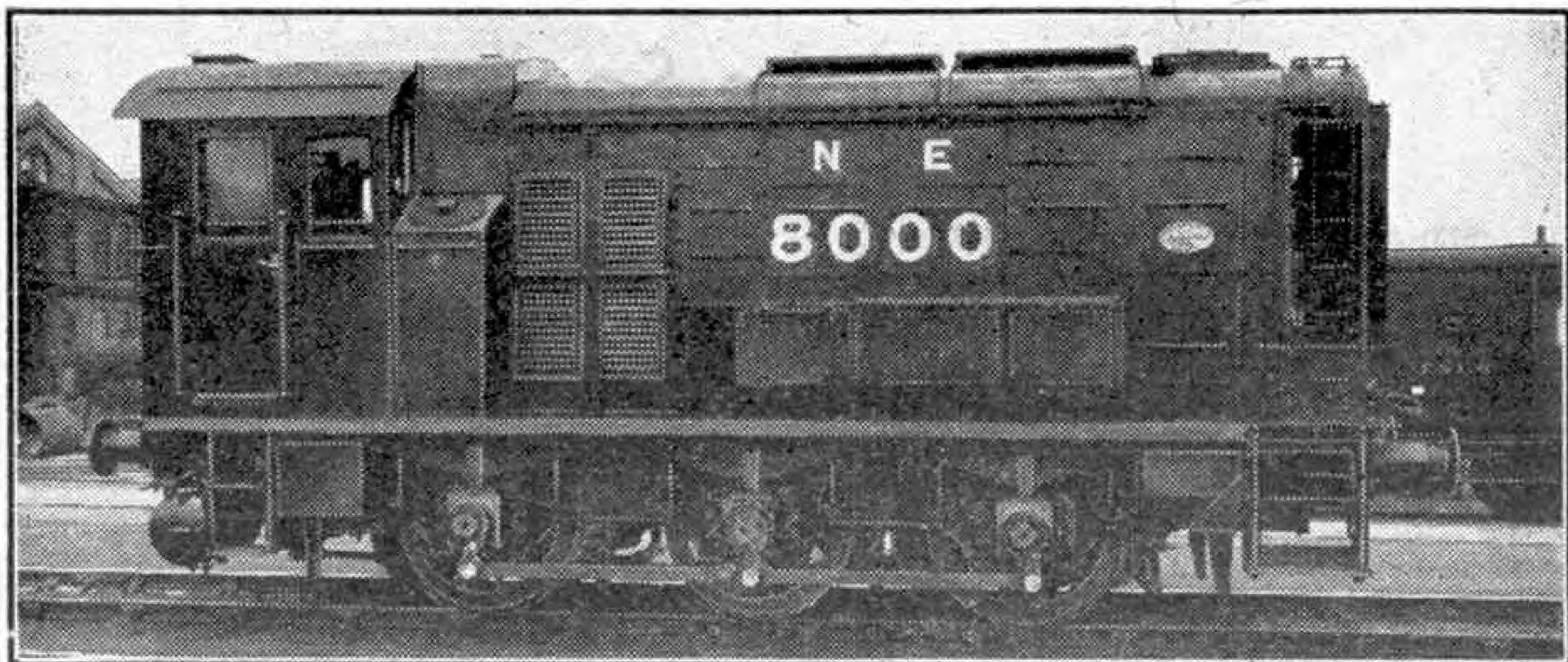
year, a tripod or other support for the camera will be useful, although snapshots can be managed with a fast lens and film. The middle of the day is the best.

Snow photographs call for rather more care. Good effects can be obtained when the sunshine is glinting on the snow, giving it a sparkling crispness. This effect is enhanced when the camera is directed towards the light, and is useful when photographing tracks of animals; but great care must be taken to see that no direct rays reach the lens, or blurring will result. Some kind of lens shade must be used for these "against the light" shots, and an improvised one can be made out of black paper or card in the shape of a small tube, but it should not be long enough to cut off any of the picture.

Many good snow pictures have been taken in the garden or home surroundings, so there is no need to seek far. Some years bring heavier falls than others, so it is just as well to be prepared to make the best of it when it comes. Snow scenes will add to the interest of your album.



Snow in the town.



Photograph by courtesy of the L.N.E.R.

L.N.E.R. Diesel-Electric Shunting Locomotives

DURING recent years the L.M.S. have had considerable experience with Diesel-electric shunting locomotives and apparently are finding that this type of locomotive has many advantages. In the opinion of the L.N.E.R. the 350 b.h.p. Diesel engine has established its capacity to do all the work of a normal shunting yard in this country, and therefore they are building four Diesel-electric locomotives of this capacity at their Doncaster Works. The Diesel-electric equipment is supplied by the English Electric Co. Ltd., and in nearly every respect is standard with that in the latest L.M.S. locomotives.

The mechanical portions of the locomotives closely follow the L.M.S. in outline, but incorporate many L.N.E.R. standard details. There is one novel feature, however, as provision has been made in the design to enable them to act as mobile power stations in addition to performing their normal shunting duties. They can be used to supply current at 500 v. or 250 v., for a two-wire or three-wire system respectively, the output being approximately 200 kW. In the event of one of the company's works, pumping stations, etc., being put out of commission due to enemy action, one of the locomotives can be run or towed to the site, and cables connected to a power panel mounted on the rear wall of the driver's cab, so that power can be supplied.

The locomotives weigh 51 tons in working order, and a starting tractive effort of 32,000 lb. can be obtained, which will be maintained up to 2 m.p.h., while the maximum speed is 20 m.p.h. The Diesel

engine, rated to give 350 b.h.p. at 680 r.p.m., is mounted with three-point suspension in a frame carried on three pairs of wheels coupled by side rods, and is directly coupled to a generator, driving auxiliaries, that is the compressor, exciter-blower and radiator fan, by belts. The generator supplies two traction motors with a voltage that varies up to a maximum of about 600 v., and each motor drives one axle through double reduction spur gearing. Control of locomotive speed is effected partly by variation of the generator field and partly by varying the engine speed by altering the supply of fuel. A chain driven governor keeps the engine speed within the range set by the driver's controller.

In winter the fully-enclosed driver's cab is heated by three radiators connected with the engine cooling system. A "dead-man" treadle device is incorporated in the control cubicle, so that the motor contactors will be opened and the brake applied if the driver should fail to keep the pedal depressed. A delay action enables the driver to move across the cab.

In order to give these locomotives the best conditions in which to prove their worth, they will all be sent to the same shunting yard, where special maintenance facilities will be provided. It is confidently hoped that they will be able to go into service for two weeks continuously before returning for a few hour's inspection and maintenance at the running shed. During that fortnight they should be available to work as many hours in traffic as required.

Suggestions Section

By "Spanner"

(673) AUTOMATIC REVERSING GEAR ("Spanner")

In constructing models of lifts, cranes, cable railways, etc., it is often desirable to incorporate a mechanism that will give a periodical reversal of the movement of the model. A mechanism for this purpose is shown in Fig. 673. The framework in this example consists of $7\frac{1}{2}$ " Angle Girders built up in the form of a square, with two channel section girders crossing it. The latter girders support a short channel section girder composed of two $2\frac{1}{2}$ " Angle Girders bolted in place in the position shown. At each side of this compound girder a Flat Trunnion is bolted, the intermediate $7\frac{1}{2}$ " compound girders forming supports for these. The upper holes of the Trunnions each carry one end of a $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip.

A 2" Rod is journalled at its lower end in the short compound girder already mentioned, the Double Angle Strip forming the upper support for the Rod. A $\frac{1}{2}$ " Pinion is fixed on the Rod between its bearings, and above the Double Angle Strip a $\frac{1}{2}$ " throw Eccentric is carried.

The bottom edge of the $2\frac{1}{2}$ " Girder supports the lower edge of a Flat Trunnion, the upper hole of which forms a bearing for one end of a Rod mounted in reinforced bearings. The other end of the Rod is journalled in the upper holes of a Trunnion bolted to the outer edge of the frame of the mechanism. The Rod carries a Worm that engages the $\frac{1}{2}$ " Pinion on the vertical shaft.

A second $\frac{1}{2}$ " Pinion engages a $1\frac{1}{2}$ " Contrate Wheel journalled in suitable bearings and driven from an Electric Motor or other power unit.

At right angles to this latter Rod a second Rod is fitted so that it is free to slide in its bearings, which are built up from Flat Trunnions and Cranks. This second Rod supports two $\frac{1}{2}$ " Pinions that are brought alternately into engagement with the $1\frac{1}{2}$ " Contrate Wheel by means of the Eccentric, which is coupled to the Rod by a 3" Strip and Swivel Bearing. The Strip is connected rigidly to the Swivel Bearing by a Pivot Bolt and Collar. The "spider" of the Swivel Bearing is allowed to rotate freely about the Rod, but is prevented from moving laterally by means of two Collars. As the Contrate is rotated it drives the Pinions on the sliding shaft and also

slowly rotates the Eccentric. This latter action causes the two Pinions to engage alternately with the Contrate, thus giving a reverse drive to the Rod.

(674) INTERNAL EXPANDING BRAKE ("Spanner")

The brake arrangement shown in Fig. 674 is particularly suitable for control by Bowden cable, of the kind used for operating bicycle brakes. Two 1" Triangular Plates are pivotally attached by lock-

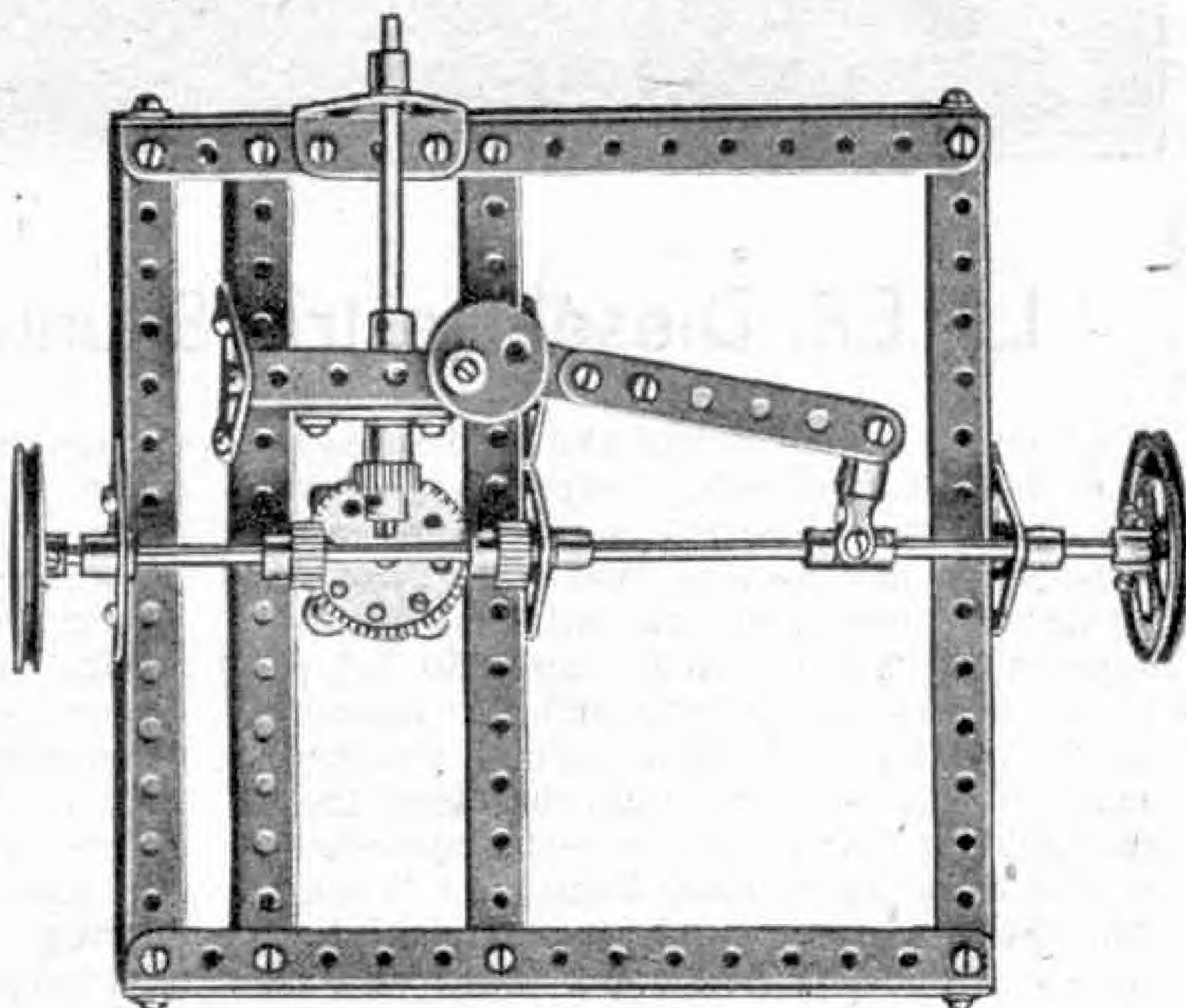


Fig. 673.

nutted $\frac{1}{2}$ " Bolts to a Face Plate. Two $\frac{1}{2}$ " Bolts secured by lock-nuts to the Triangular Plates serve as brake shoes, and are connected by short lengths of Spring Cord. The operating cam is a Collar, the tapped hole of which is screwed on the end of a Pivot Bolt. The Collar is prevented from turning on the Bolt by a Grub Screw, which is inserted in the opposite tapped hole of the Collar and screwed against the end of the Pivot Bolt.

The Pivot Bolt is journalled in a reinforced bearing consisting of a Flat Bracket spaced by a Washer from the Face Plate, and a $\frac{1}{2}$ " Bolt is attached by a Collar to its shank. A Loom Heald, or a length of wire, connects the $\frac{1}{2}$ " Bolt to the brake lever.

(675) TWIN-DRIVE STEP-UP GEARING (J. N. Summerfield, Tamworth)

Model-builders in search of novel mechanisms will be interested in the twin-drive step-up gearing shown in Fig. 675. Although this is not a very practical arrangement, it has interesting features and forms a novel step-up gear ratio of 1:4.

The driving shaft 1 carries a Socket Coupling 2, which grips in one end a Sprocket Wheel and in the other a $2\frac{1}{2}$ " Gear Wheel. A Bush Wheel 3 is fixed to the Rod 1, and to it are bolted two Obtuse Angle Brackets 4 and 5. Two Bevels 6 and 7 are mounted on $\frac{1}{2}$ " Bolts lock-nutted in the Brackets, and two further Bush Wheels 8

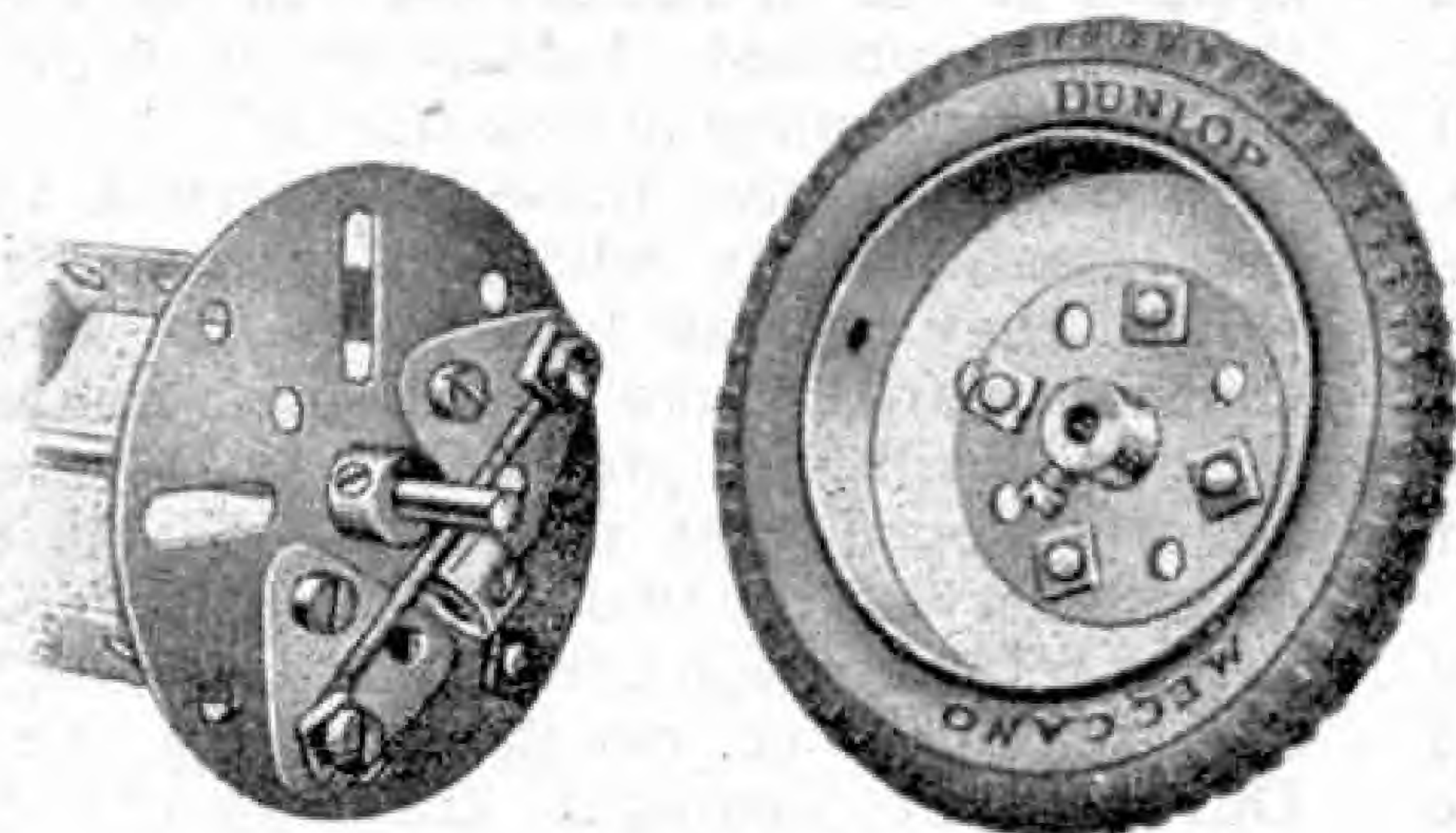


Fig. 674.

are then placed on the Rod 1 as shown. The drive is transmitted to the Rods 9 and 10, which are journaled in diametrically opposite holes in the Bush Wheels and carry at their inner ends the $\frac{3}{4}$ " Pinions 11 and 12.

The Bevels are arranged so that they mesh with the $2\frac{1}{2}$ " Gear and with the $\frac{3}{4}$ " Pinion, and to effect this it may be necessary to adjust the Obtuse Angle Brackets slightly. If properly constructed the mechanism works quite smoothly, and will transmit fairly heavy loads.

BEGINNER'S CORNER

One of the most jolly things about Meccano model-building is that one never comes to the end of the fun. There is always more ahead, always some new and interesting model to build, and once a model-builder has learned the simple basic rules of Meccano construction he is able to build even the most complicated machines and mechanical movements without difficulty. Young and new model-builders therefore should make themselves familiar with these simple methods before attempting to build any of the larger structures, such as giant hammerhead cranes and locomotives. The best plan is to concentrate first of all on the more simple models shown in the Instruction Manuals and in the "New Meccano Models" pages of the "M.M." each month, taking care to follow the instructions closely and to build the models just as they are shown. Then each model should be studied carefully and an attempt should be made to improve on our design. Every model can be built in several different ways, and by substituting other

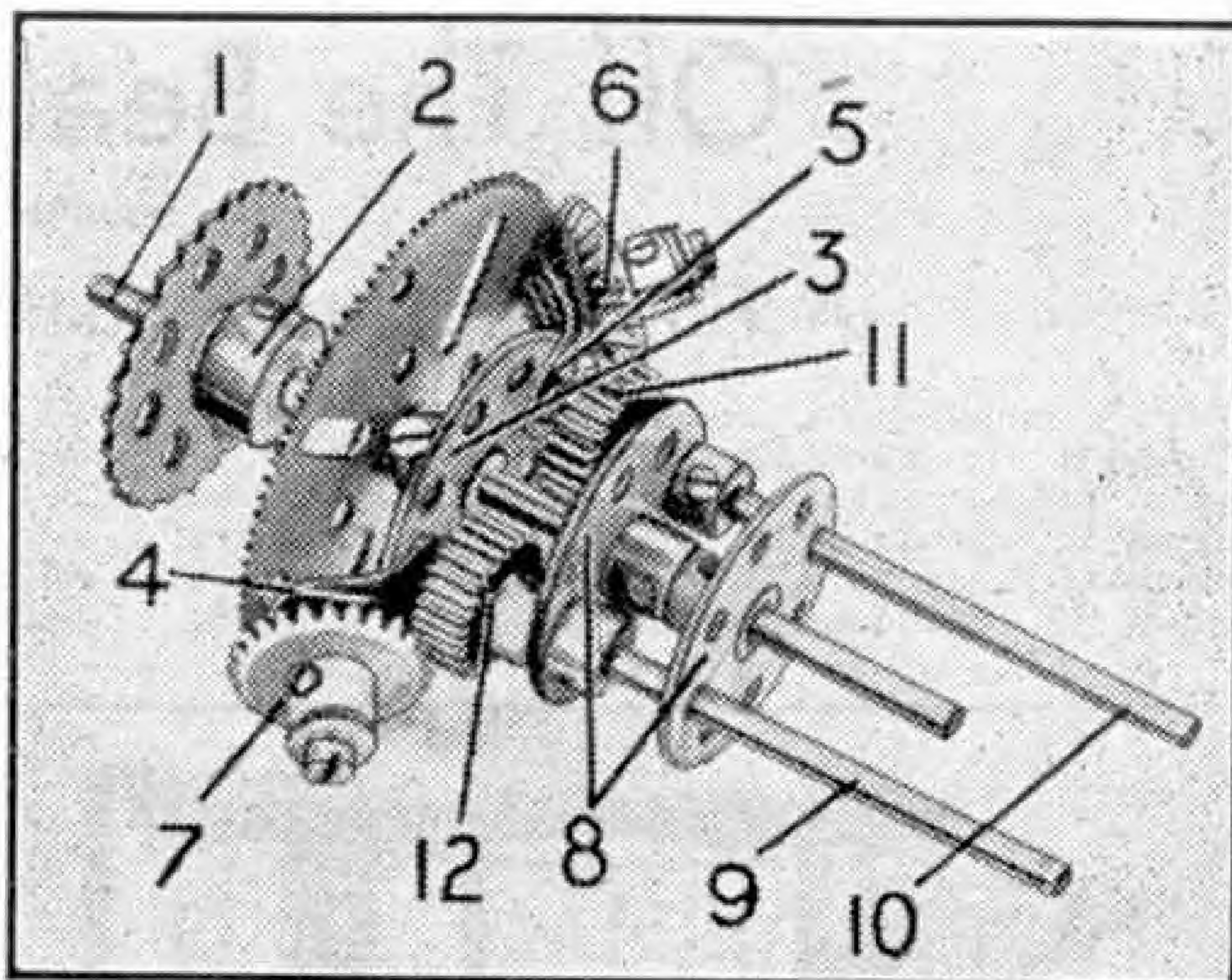


Fig. 675.

Meccano parts for those specified in the instructions and making small alterations in the design, the model-builder will increase his knowledge of Meccano constructional principles and will obtain much more fun and pleasure from the hobby. Care should always be taken to make all Bolts and Nuts quite secure, so that when a model is completed it will be a firm and rigid structure.

"Calling All Model-Builders!"

A Fine Opportunity to Win an Attractive Prize

We are aware from correspondence reaching this office that there are many keen model-builders who would like to participate in the competitions announced in the "M.M.," but do not do so because they possess only a small quantity and variety of Meccano parts. Consequently they feel, although quite wrongly, that they will not stand an equal chance with more fortunate competitors who have a large and varied stock of parts at their disposal.

We wish to persuade as many as possible of these hesitant Meccanoites to become regular entrants in our competitions, and in designing this month's contest we have borne in mind their difficulties and have attempted to make the conditions as nearly as possible equal for everyone, irrespective of the size or scope of his or her outfit. This has been done by limiting to 12 the kinds of Meccano parts that may be used in building models.

for entry in the contest, and the 12 parts we have selected are those most likely to be in the possession of the majority of model-builders. These parts are named in the panel on this page.

It should be noted, however that it is *not* necessary for a model to incorporate *all* of the parts named in the list.

Competitors are allowed complete freedom to choose any subject they like for their models, but before making a decision they should consider carefully whether it is possible to reproduce the proposed subject realistically from the range of parts they

are permitted to use. Careful selection of the subject will be an important factor in deciding a model's chance of success, for in awarding the prizes the judges will look specially for models that make the best possible use of the parts permitted, and which show originality in their constructional details.

The competition is open to readers of all ages, and entries will be divided into two sections, A and B. In Section A will be grouped entries from all competitors over 14 years of age, while entries from competitors under 14 will be placed in Section B.

A separate set of prizes will be awarded in each Section, and will be as follows: First, Cheque for £2/2/-; Second, P.O. for £1/1/-; Third, P.O. for 10/6. There will be also a number of consolation prizes.

Competitors should note that actual models must not be sent. All that is required is either a photo-

graph or a drawing of the model, together with a short description of its principal features and a list of the parts used in its construction. These should bear the competitor's age, name and address, and should be enclosed in an envelope addressed: "Limited Parts Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."

The closing date of the competition will be 28th February, 1945.

Each competitor awarded a prize will be notified by letter as soon as possible after the closing date.

"LIMITED PARTS" COMPETITION

List of Meccano parts to be used in building models:

- (1) Strips
- (2) Angle Girders
- (3) Rods
- (4) Angle Brackets ($\frac{1}{2}$ " \times $\frac{1}{2}$ ")
- (5) Trunnions
- (6) Collars
- (7) Pulleys (1" fast)
- (8) Flat Plates ($5\frac{1}{2}$ " \times $3\frac{1}{2}$ ")
- (9) Pulley Wheels (3")
- (10) Pulley Wheels ($\frac{1}{2}$ ")
- (11) Bush Wheels
- (12) Meccano Cord (or string)

Nuts and Bolts may be used in any number required.

Off The Beaten Track!

By "Spanner"

A Fine Meccano Model of Unusual Type

THE possibilities for model-building of a Meccano Outfit are practically unlimited, and there are few machines, mechanisms or structural devices that cannot be reproduced in one form or another from the parts it contains. Many model-builders fail to obtain the maximum enjoyment from their hobby,

yield of the furnace is reduced. The best way to meet this difficulty is to get rid of as much gangue as possible before the ore is placed in the furnace, and in the case of magnetite, an iron ore that has strong magnetic properties, this can be done quickly and efficiently by means of the magnetic concentrator that forms the subject of Adair's model. Magnetite is another name for loadstone, which my readers will already know as an ore of iron that is magnetic, and which seems to have been used in the earliest compasses.

The action of the machine is simple. Crushed ore and gangue are fed on to a vibrating chute 1, Fig. 2, which delivers it to a conveyor belt 2. The belt carries it under another belt 3 placed transversely in the machine, and above which magnets are arranged. As the mixture of iron and earthy matter travels under the transverse belt the magnetic portion of it is pulled upward by the magnets and held firmly against the underside of the cross-belt, to which it adheres until it is carried beyond the influence of the magnets, when it falls from the belt and drops down a chute 4. The non-magnetic gangue remains on the main conveyor and travels along until it is discharged down a chute 5.

The model is driven by an Electric Motor, and its main constructional details are fairly easy to follow from the illustrations. In the drive to the

various parts of the mechanism a Worm on the Motor shaft engages two $\frac{1}{2}$ " Pinions 4, Fig. 3. A Coupling 5 is fixed on the shaft 7 and serves as a bearing for the shaft 6.

From the upper Pinion 4 the drive is taken by a $\frac{1}{2}$ " Pinion 8 to a 50-teeth Gear 9 fixed to shaft 7. This shaft bears also a $\frac{3}{4}$ " Pinion 10, which drives a 50-teeth Gear, the latter being fixed by a Socket Coupling to a $\frac{1}{2}$ " Pinion 12 running free on its shaft. This $\frac{1}{2}$ " Pinion drives 57-teeth Gears 13 and 14.

The Gears 13 are mounted on longitudinal shafts that transmit the drive to the rollers carrying the main conveyor belt. The rollers consist of Boilers

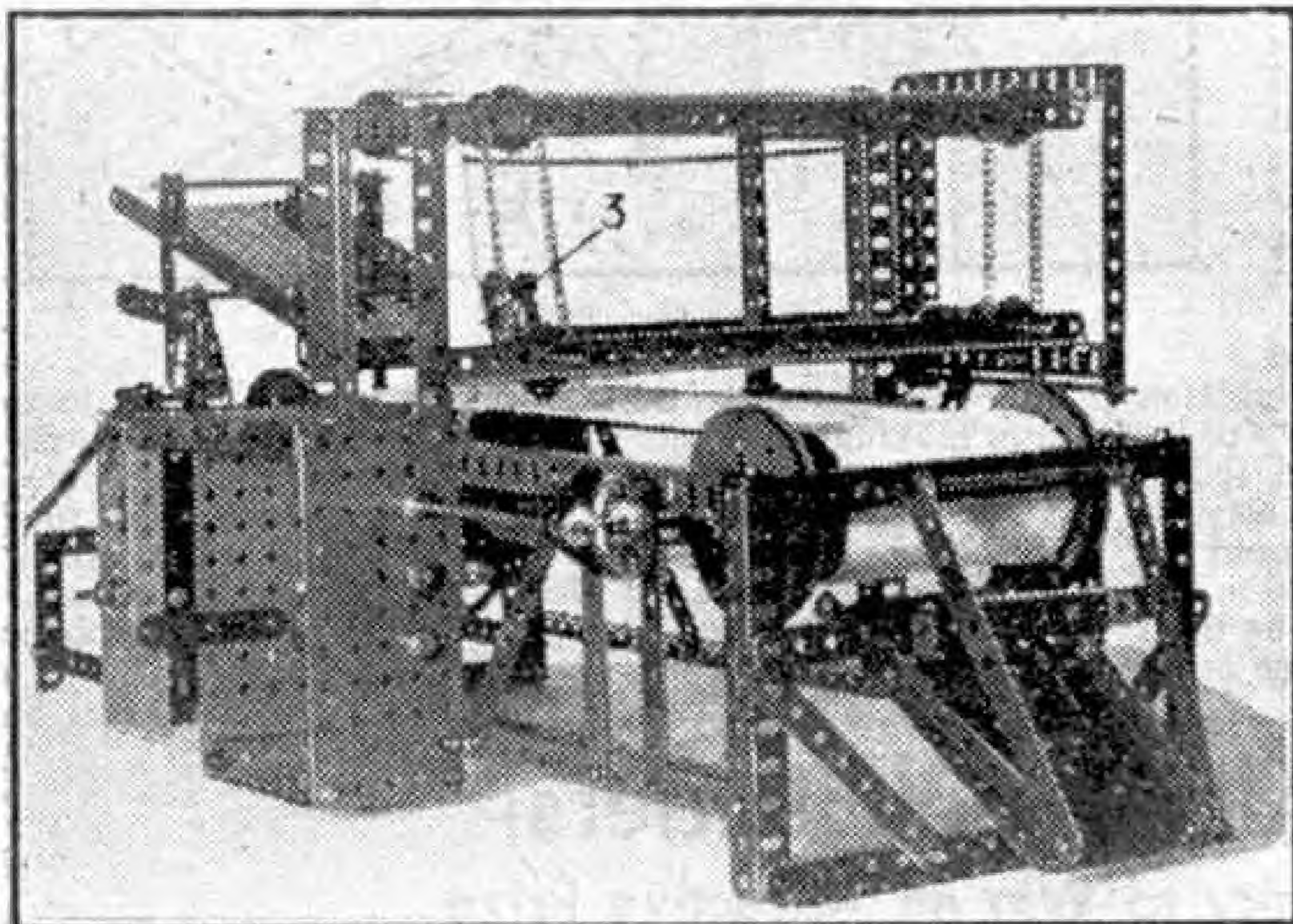


Fig. 1. The model magnetic concentrator described on this page. It was built by B. Adair, Maryport.

however, because they do not vary the subjects of their models sufficiently. The chief subjects to receive their attention are ships, locomotives, motor cars, aircraft, excavators and cranes of various types, and I am afraid that many of them seldom venture beyond this limited range.

By trying to reproduce some of the less common machines and engineering devices, and relying more on his inventive abilities, a model-builder will get even greater pleasure from Meccano, for once the kernel of an idea is formed it is really jolly good fun developing it, and finally putting it into practical shape with Meccano parts. This I am sure was the experience of Brian Adair, Maryport, in designing and building the interesting model of a magnetic concentrator shown in Figs. 1 and 2 on this page, for in addition to breaking new ground, he had the satisfaction of including in it novel ideas of his own. It is the first Meccano model of this type that has come to my notice, representing a special type of machine known as a magnetic concentrator, which is used in the iron smelting industry.

When iron ore is treated in a blast furnace to reduce it to metallic iron, it is necessary to get rid of or "flux away" the earthy matter in the ore, which is known as gangue. This is done by mixing with the ore a certain amount of lime, but as the lime takes up furnace room the effective

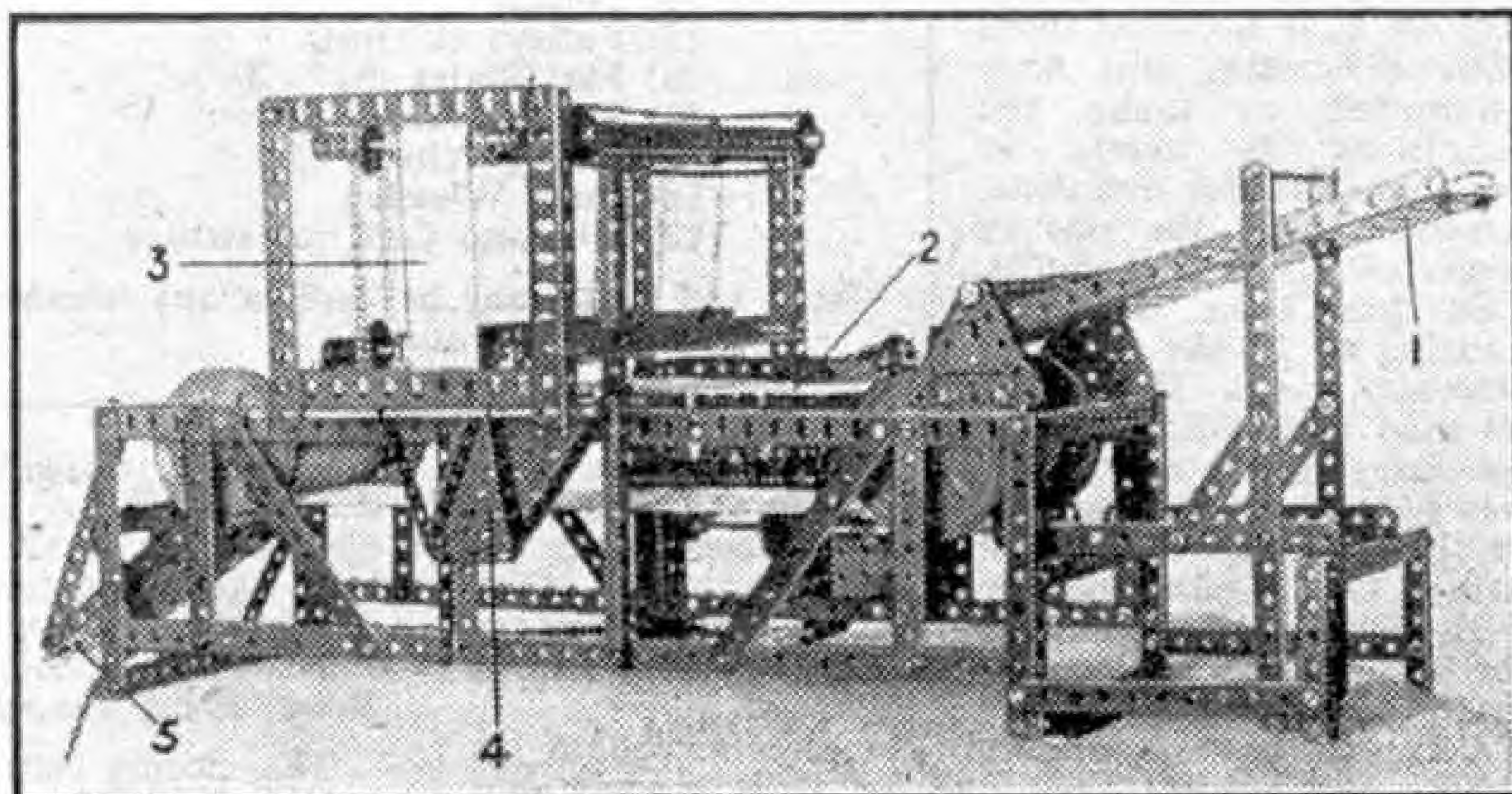


Fig. 2. Another view of the concentrator, showing the side opposite from that seen in Fig. 1.

complete with ends, bolted to 3" Pulleys.

The necessary vibratory action is given to the chute 1 by an Eccentric 16, Fig. 3, connected by links and levers to the chute. The shaft on which the Eccentric is fixed is driven by the Motor through lower Pinion 4. The drive from the Motor to the transverse conveyor is taken through the Pinion 12 and Gear 14, the final drive to the conveyor rollers being by means of Sprockets and Chain. This conveyor travels around four rollers, each of which consists of a Sleeve Piece mounted between $\frac{3}{4}$ " Flanged Wheels, and each roller is power driven. This multiple drive system is necessary owing to the very considerable friction and the "drag" caused by the magnets.

If suitable permanent or electro magnets are arranged above the transverse belt, the model will work in a realistic manner. If it is decided to use an electro-magnet this can be made from two Meccano Bobbins, fully wound with No. 26 S.W.G. cotton-covered wire and fitted with pole pieces formed from $1\frac{1}{2}$ " Angle Girders. To the inside flange of each Angle Girder four $1\frac{1}{2}$ " Strips are bolted, and to the outside of the same flange are fixed six Flat Brackets, all the parts being secured by means of a $\frac{1}{4}$ " Bolt. The Bobbins are each fitted with a $1\frac{1}{2}$ " Rod that forms the core, and these are inserted in the end holes of the Strips and the Angle Girders. The whole unit is then fitted inside a Boiler End, where it is held in place by nuts on the shanks of the $\frac{1}{4}$ " Bolts.

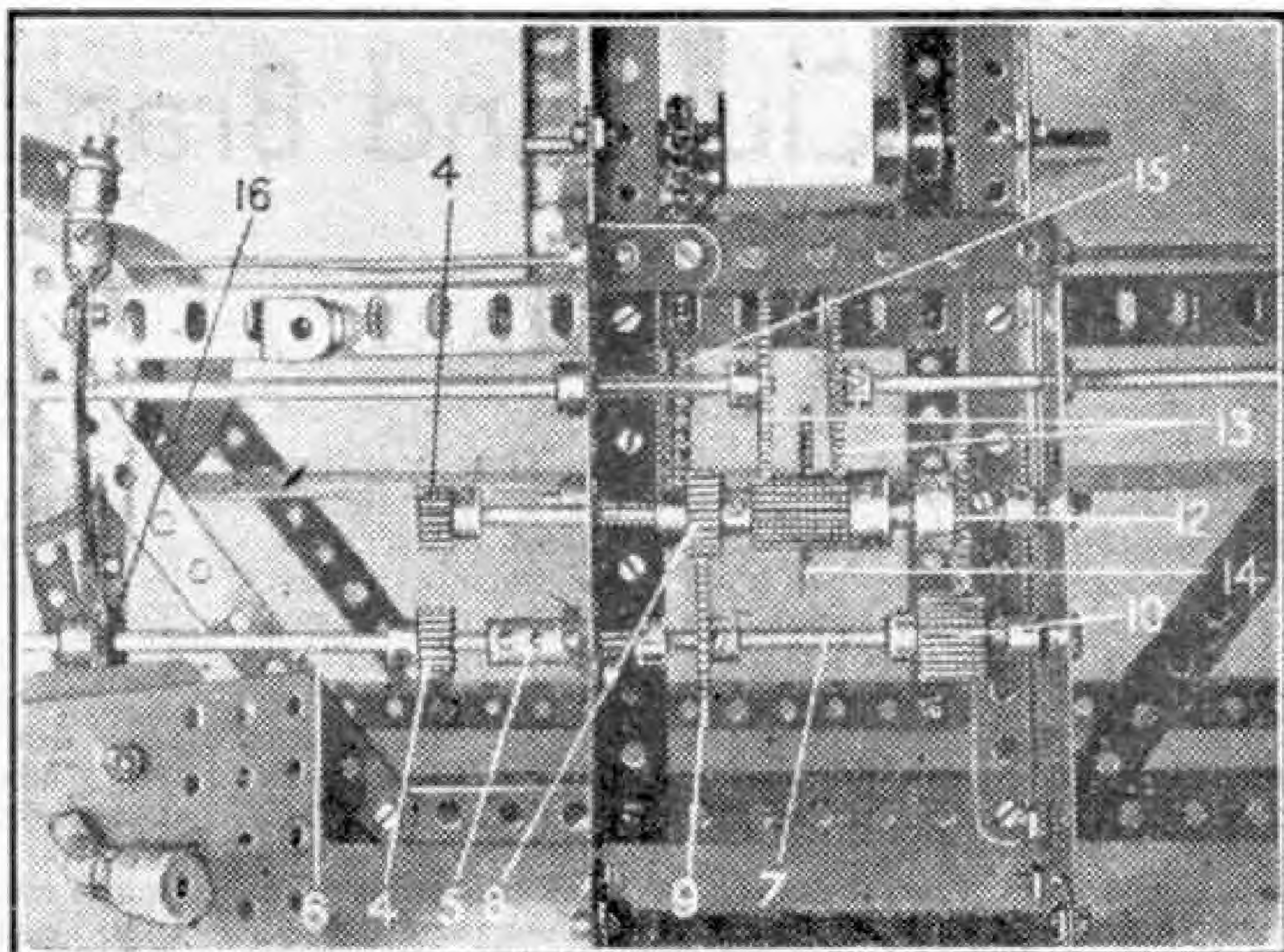


Fig. 3. The operating mechanism of the model.

Suitable conveyor bands can be made quite easily from a piece of thin cloth. Care should be taken to cut the strips parallel sided and to sew the joint neatly and carefully to eliminate any lumpiness.

For demonstration purposes the iron ore and gangue with which the real machine has to deal can be represented by a mixture of dry soil or sand, with iron filings or other small bits of metal.

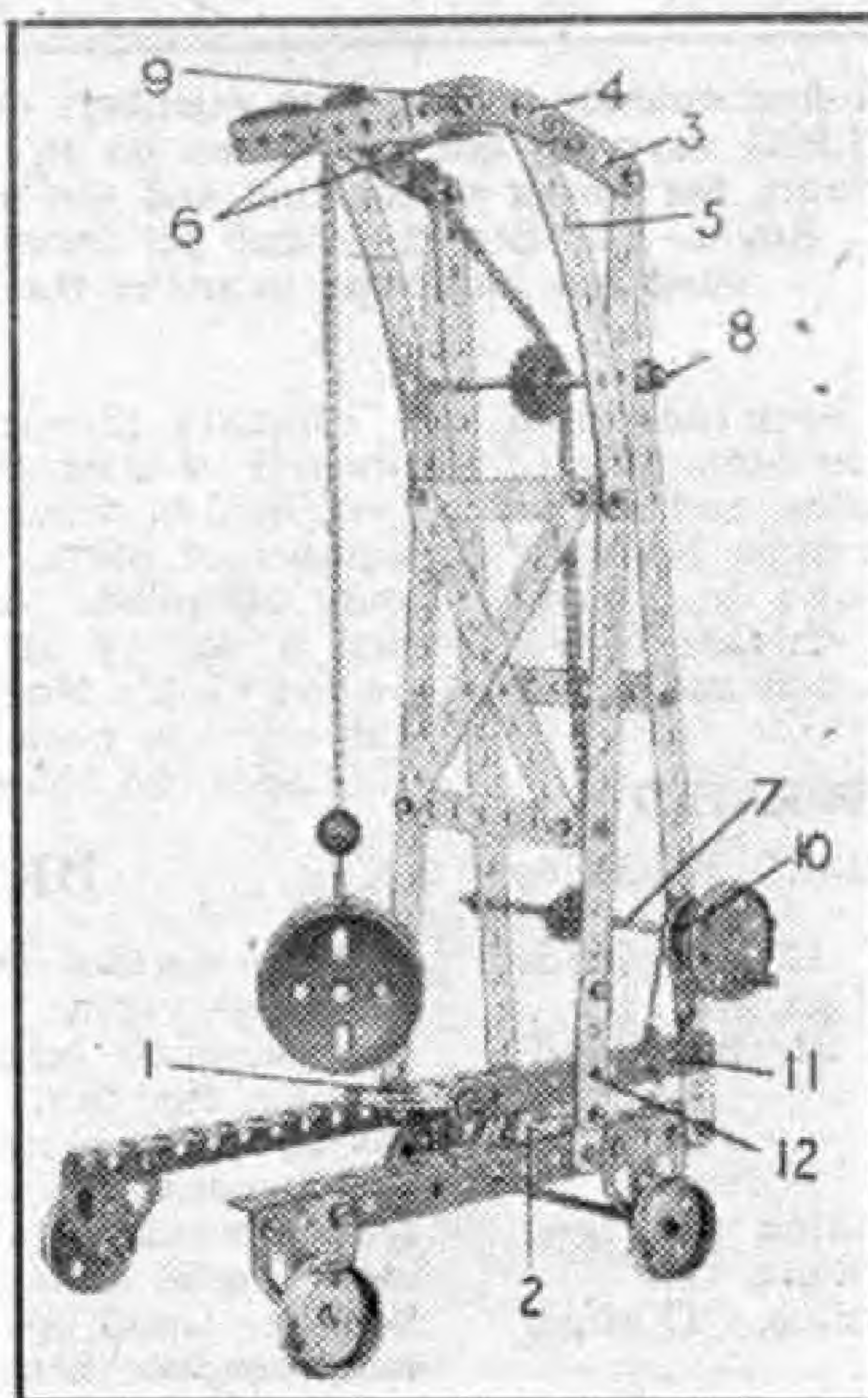
New Meccano Model Portable Garage Crane

Many "M.M." readers will be familiar with the light and handy portable cranes sometimes seen in repair garages, where they are used for lifting engine units and other car parts into and out of the chassis. It is one of these useful hoisting devices that forms the subject of the New Model shown below. The tower-like jib of the crane is supported on a wheeled base, which consists of two $7\frac{1}{4}$ " Angle Girders joined at their rear ends by a $3\frac{1}{2}$ " x $2\frac{1}{4}$ " Flat Plate. Two $1\frac{1}{2}$ " Corner Brackets 1 and 2 brace the Girders to the Plates and ensure rigidity. The travelling wheels are $1\frac{1}{2}$ " Flanged Wheels and they are fixed on Rods journaled in Flat Trunnions bolted to the $7\frac{1}{4}$ " Angle Girders.

The jib is formed from four $12\frac{1}{2}$ " Strips, two of which are bolted at each side of the base. A 2" Strip 3 and a Curved Strip 4 extend the jib forward at each side, the two sides being spaced apart by Double Angle Strips 6. Bracing is provided by a $5\frac{1}{2}$ " Curved Strip 5 at each side. The tower portion is also braced by means of $3\frac{1}{2}$ " Strips and crossed $5\frac{1}{2}$ " Strips, bolted in the positions indicated.

The hoisting handle is a 2" Pulley mounted on a Rod 7 journaled in the $12\frac{1}{2}$ " Strips, and it is fitted with a Threaded Pin. Also fixed on this Rod is a 1" Pulley 10 and a Cord Anchoring Spring. A piece of

Sprocket Chain is tied at one end to the Cord Anchoring Spring, then passed over a 1" Sprocket Wheel fixed to a Rod 8, and finally over the jib-head Sprocket, which is fixed to a Rod 9. A Loaded Hook is attached to the other end of the Chain.



A working model of a portable garage crane.

The winding shaft is fitted with a band brake constructed as follows. A $4\frac{1}{2}$ " Strip 11 pivoted to the rear $12\frac{1}{2}$ " Strip of the tower, slides between the front $12\frac{1}{2}$ " Strip and a $2\frac{1}{2}$ " Strip 12 bolted to it. The front end of the $4\frac{1}{2}$ " Strip is fitted with a Threaded Pin, which forms a convenient handle. A piece of Cord is tied at one end to the $4\frac{1}{2}$ " Strip in the hole indicated, then is passed over 1" Pulley 10 and its other end is tied to the Strip. By pressing on the Strip the Cord is tightened around the Pulley and so prevents the load from dropping when the winding handle is released. It is then possible to push the crane and its load to any required place.

Parts required to build model Portable Crane: 4 of No. 1; 2 of No. 2; 1 of No. 2a; 2 of No. 5; 1 of No. 6; 2 of No. 8b; 2 of No. 15a; 1 of No. 15b; 4 of No. 20; 1 of No. 21; 1 of No. 22a; 1 of No. 33; 40 of No. 37a; 48 of No. 37b; 5 of No. 48b; 1 of No. 57b; 5 of No. 59; 2 of No. 89; 2 of No. 90; 1 of No. 94; 1 of No. 96; 1 of No. 96a; 1 of No. 115; 4 of No. 126a.



Club and Branch News



WITH THE SECRETARY

NEW YEAR GREETINGS

Once again I have to send New Year greetings to all Guild and H.R.C. members. The year that is now beginning should be our brightest since 1939, for wonderful progress has been made during the last 12 months and a victorious peace now seems near.

The outlook is brighter too for the Guild and the H.R.C. There are still Clubs and Branches that are suffering severely from the effects of the war, and indeed most of them are showing these in some form or other. Meetings are now being held in larger numbers and more regularly, however, and many new Clubs and Branches are being formed, as the lists that I publish regularly on this page show. Here is a great chance for all enthusiasts. If a Club or Branch exists or is being started in their vicinity they should join it immediately, and do their utmost to promote its success. If there is no Club or Branch that can be joined, then efforts should be made to start one. All that is necessary is to join up with a few friends of the same mind, and with them to begin informal meetings. News of these spreads, and I am always glad to help by providing lists of members living in the neighbourhood and by including the names and addresses of the promoters in my lists.

There is a wonderful opportunity of making 1945 an outstanding year in Guild and H.R.C. progress. This can be achieved if all do their share and begin their efforts now, and I want members to make a New Year resolution that they will do their utmost to push along this great revival.

A NOTE FOR EVERY GUILD MEMBER

A 1945 revival must not be the work of Clubs and Branches alone—each individual member also must share in it. I have been able to help countless members with information and advice throughout the war period, but there must be many more members, especially new ones, who do not yet write to me, and they should do so, whether to ask for help of some kind or simply to tell me about themselves and their hobbies.

BRANCHES RECENTLY INCORPORATED

- 468. HORLEY—Mr. K. G. Hill, "Etretat," Balcombe Road, Horley, Surrey.
- 469. DAVYHULME—Mr. J. A. Walker, 121, Moorside Road, Davyhulme, Manchester, Lancs.
- 470. SLOUGH—Mr. M. A. Ricketts, 6, Merton Road, Slough, Bucks.

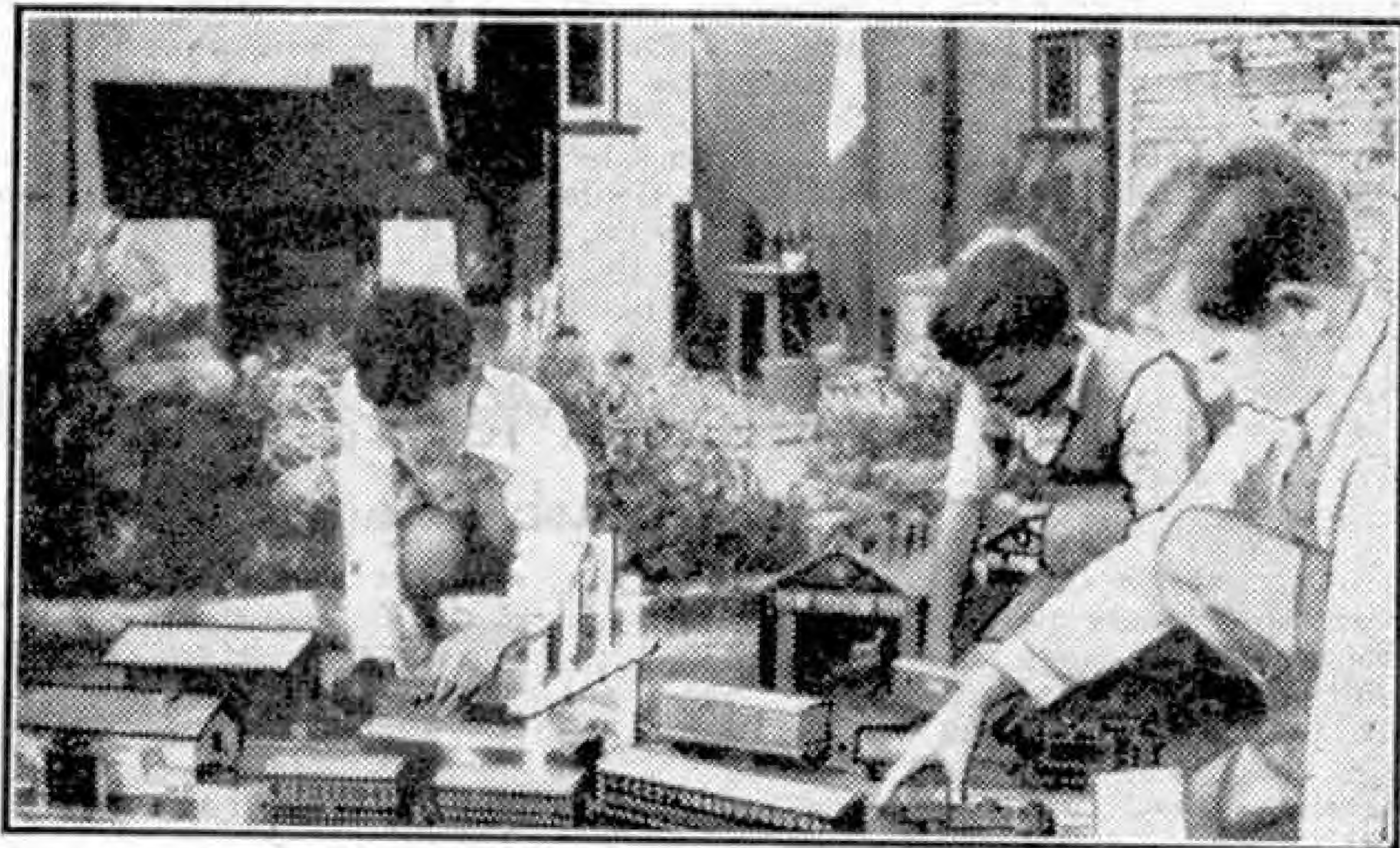
PROPOSED CLUBS

- CANTERBURY—Mr. Q. Griggs, 2, Station Cottages, Station Road West, Canterbury, Kent.
- DURHAM—Mr. C. Hindson, Westholme, Durham Moor, Durham.
- AUSTRALIA—Mr. T. Dunwoody, 333, Orrong Road, East St. Hilda, Melbourne, Australia.

CLUB NOTES

COUNTY HIGH SCHOOL (LEYTON) M.C.—Various hindrances to Club meetings have made it necessary to delay the construction of the Club model of a Transporter Bridge. Instead members are building a model runway for a glider. New members are coming in and good progress is being made. *Secretary:* F. G. Timms, County High School for Boys, Essex Road, Leyton, London E.10.

BARKER'S BUTTS SCHOOL (COVENTRY) M.C.—A keen but pleasant competitive spirit animates members, who are busy constructing models for entry in the weekly Points Contests. The stock of Meccano Parts is being enlarged, and practically any large model can now be built. An Exhibition is to be held. Club roll: 25. *Secretary:* D. Percival, Overslade Crescent, Coundon, Coventry.



A fine outdoor layout, with members of the North Wembley Branch of the H.R.C. carrying out operations on it. From left to right they are G. D. Nunn, the owner of the line and the founder of the Branch, J. Gains and J. Boyle. The Branch is not yet incorporated, but members already enjoy good fun and hope to make the necessary progress very soon.

PHOENIX (SOUTHPORT) M.C.—The weekly meetings are full of interest. In model-building a contest has been held in which members were given only a limited number of parts, and amusing and ingenious results were obtained. A Lantern Lecture has been given and a variety of operations have been carried out on the Club's Hornby Railway. A small but efficient Library has been started. Club roll: 10. *Secretary:* P. Lapes, 25, Norwood Crescent, Southport.

BRANCH NEWS

WOOD GREEN—Members began the Winter Sessions with new vigour. Excellent recruits have joined the Branch, each bringing material that has helped to increase the fun. A new layout with double track has now been made possible. *Secretary:* M. J. Gilbert, 439, Lordship Lane, Wood Green, London N.22.

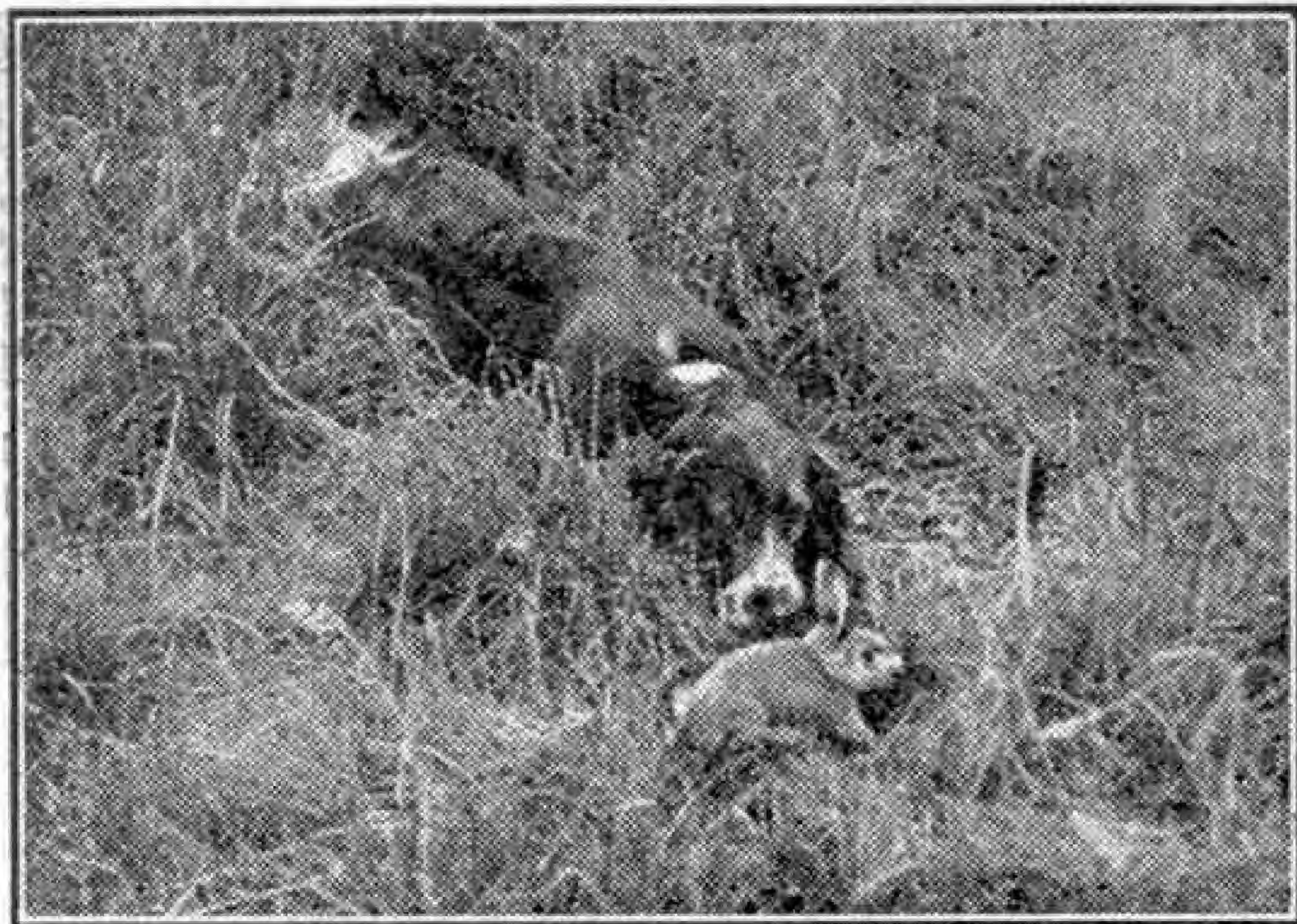
DAVYHULME (MANCHESTER)—Excellent meetings have been arranged by this newly incorporated Branch. Good operations are now being carried out, each member being given a definite official post to ensure efficiency and realism. *Secretary:* J. A. Walker, 121, Moorside Road, Davyhulme, Manchester.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

UNUSUAL FRIENDS

Companionship between a dog and a rabbit must be rare, as these animals are enemies by nature; but the accompanying illustration shows that it can be a reality. The dog is a spaniel, "Ginger," and is



Strange playmates. A spaniel and a rabbit who are great friends and play together regularly. Photograph by B. Chulindra, Wadebridge.

rather rough to the rabbit "Titch" while playing, but the latter does not seem to mind very much; he only struggles for life when he is stepped on by the spaniel. They usually play in the field by running or chasing each other in their own way. When "Titch" is tired, he just lies down panting, while "Ginger" does the same and licks poor bunny. The spaniel goes straight to the rabbit's hutch when let out of the house, and "Titch" comes out of his chamber, poking his nose out to give "Ginger" a kiss, so to speak. B. CHULINDRA (Wadebridge).

LITTLE JOHN'S GRAVE

Readers may like to see the accompanying picture of Little John's grave in the churchyard at Hathersage, in Derbyshire. The grave is 10 ft. long, marked by two stones and sheltered by an old yew tree. The white stone in the centre states that the grave is under the care of the Ancient Order of Foresters. Every year a band of pilgrims from this Order, dressed in Lincoln green and Sherwood red, place a wreath of cotton grass from the moors around upon the grave.

Credence in the belief that Little John lies here is based on the fact that his cap and bow once hung in the church porch, and that a thigh bone 32 in. long was found in the grave. By all normal standards Little John must have stood 8 ft. high! He was one of Robin Hood's earliest followers and remained with the outlaw until the latter died at Kirkley Abbey, in Yorkshire.

F. RODGERS (Derby).

THE PRETORIA EXPRESS

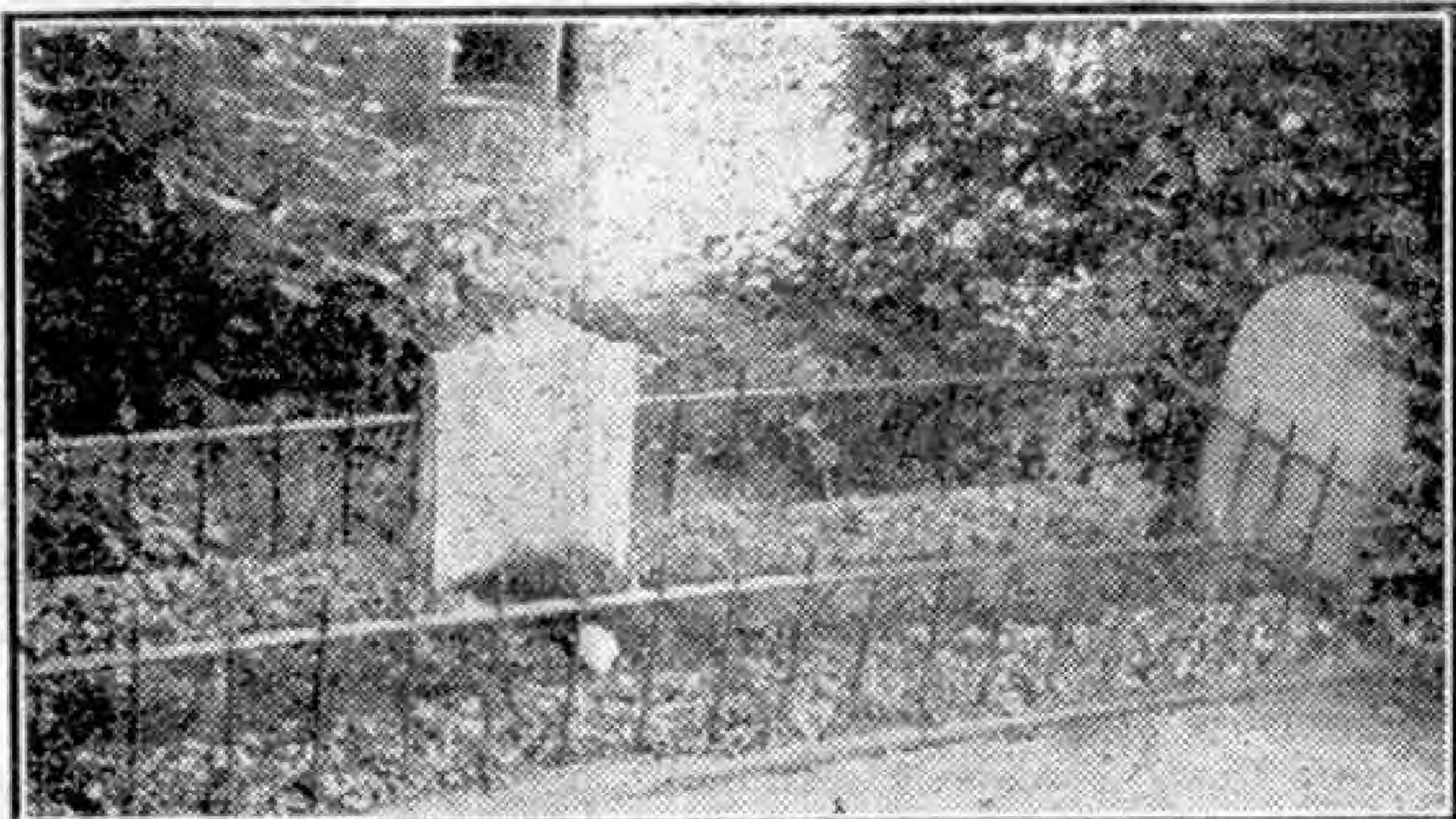
Every day three expresses run in each direction between Johannesburg and Pretoria. These six trains are the fastest in South Africa and among the fastest in the Southern Hemisphere. They cover the 43 miles between the two cities in 63 min., including a stop at Jeppe, about three-quarters of a mile from Johannesburg, a 1-min. stop at Germiston, 8½ miles farther on, and three or four slacks.

This does not seem very fast, but for the Pretoria-Johannesburg trains at least it means hard working. The following facts will make this clear. The trains weigh about 500 tons and are hauled by two electric motor-coaches, overhead system. From Fountains, two miles out of Pretoria, the line rises at an average gradient of 1 in 66 for four miles. It is then practically level for three miles, after which it rises for 22 miles, except for two short breaks, at an average gradient of about 1 in 150, but some of the gradients are considerably steeper. The line then falls for a mile and rises the last two miles into Germiston. There is a rise of 190 ft. over a summit of about 200 ft. to Jeppe, and a further rise of 66 ft. to Johannesburg.

A short while ago I was fortunate enough to make a journey on one of these expresses. The train left Pretoria eight minutes late, thus giving it a chance to show its paces. It rose up the first four miles of climbing at about 45 m.p.h. and covered the 34 miles to Germiston in 40 min., thus making an average of 51 m.p.h., with a top speed of about 63 or 64 m.p.h. The scheduled time for this stretch is 47 min. It took 10 min. on to Jeppe, again averaging 51 m.p.h., including a slowing from about 55 to 25 m.p.h. for crossing from the relief to the fast line. This run is allowed 11 min. on the schedule. Despite the narrow gauge of 3 ft. 6 in. and the large overlap, the train was very steady.

This line is now being relaid as continuous welded track, which considerably improves the smoothness of running and eliminates much of the noise.

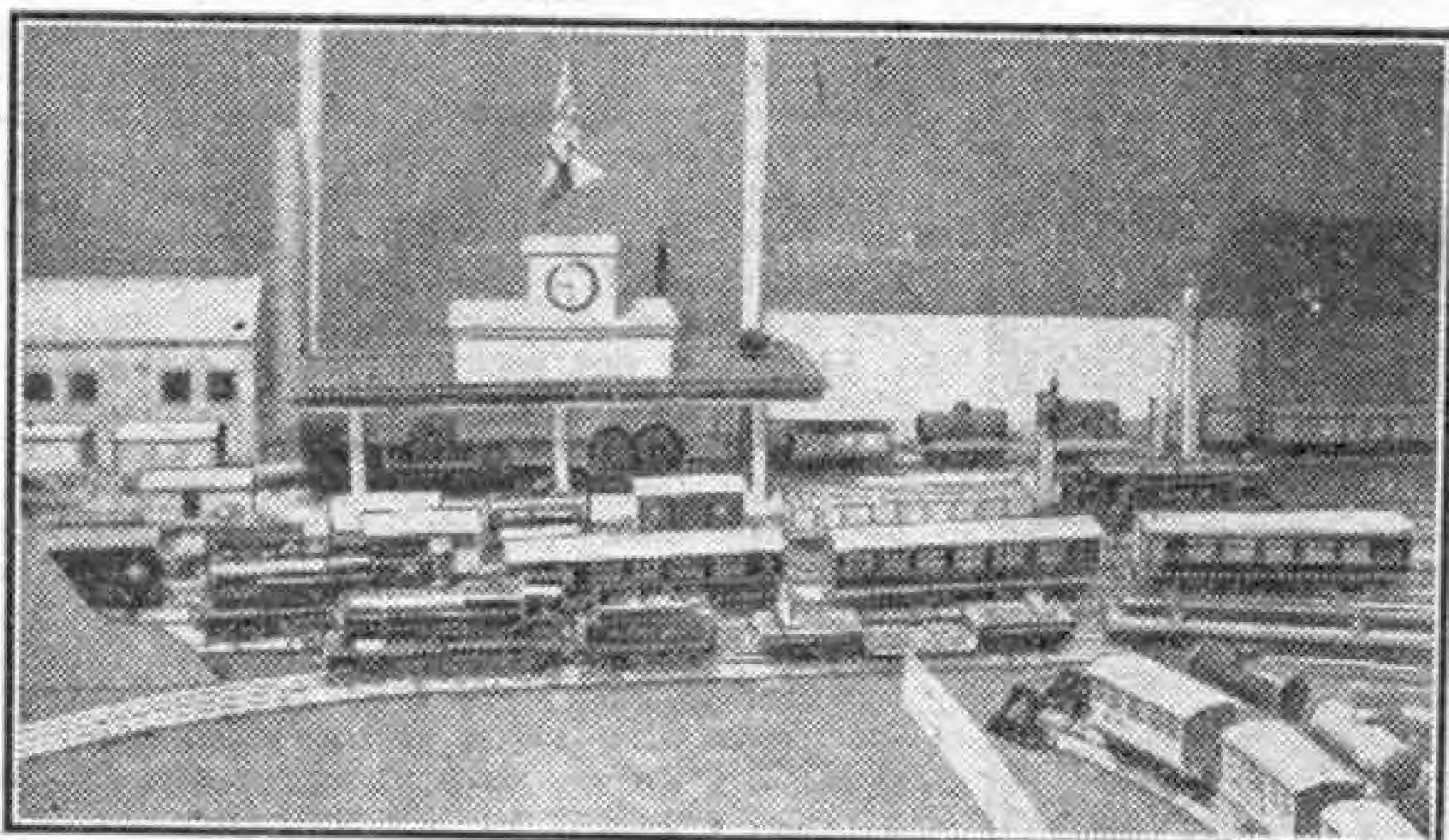
G. S. KEMPIS (Johannesburg).



Little John's Grave, in Hathersage Churchyard, Derbyshire. Photograph by F. Rodgers, Derby.

A Fascinating Hornby Electric Layout

WE illustrate on this page sections of a Hornby electrically operated railway owned by our reader Mr. A. R. Casebrook, New Bradwell, Bucks. On this system the fullest advantage has been taken of the possibilities of electrical working, and fascinating control and signalling schemes have been developed.



One of the stations on the layout of Mr. A. R. Casebrook, New Bradwell, described on this page.

At present the main line is continuous, but an elevated extension is in hand which is to lead to a terminal station. This will increase still further the realism of operations which are carried out by means of Hornby Locomotives and rolling stock to represent L.M.S. practice.

The owner is fortunate in having so extensive a space as a room 18 ft. by 14 ft. devoted to the railway. There are five oval tracks with sidings and loop lines. Two pairs of up and down tracks constitute the main line route, one pair in each direction being for fast traffic and the other pair for secondary services. The fifth track is considered to be a local affair, serving a "mining area" arranged with realistic accessories and effects. Return loop lines cross the centre of the layout and a series of crossover points between the individual tracks of the main oval allow trains to be directed from any track to the loop lines, sidings, or to other running lines.

There are two stations on the main routes, "Stanton Central" and "Wolvertown." The return loops also serve different places in the "Company's" territory, the fast lines running through "Barrieldown" and "Lake-side." Other stations are "Lower Brad" and "Far Point," served by the slow tracks only.

There is an engine shed with turntable and sidings at one side of the layout. At the opposite side is a carriage cleaning depot, also another shed where a breakdown train is stationed together with the engine allocated to this duty. Other lineside buildings include a petrol and oil depot, a cattle loading "bank," a tar distillery and a factory. Wagons are shunted to load and unload at these points, and at a goods platform near "Lower Brad," the goods platform and the sidings serving it have cranes for the handling of freights.

The working arrangements provide for the operation of five

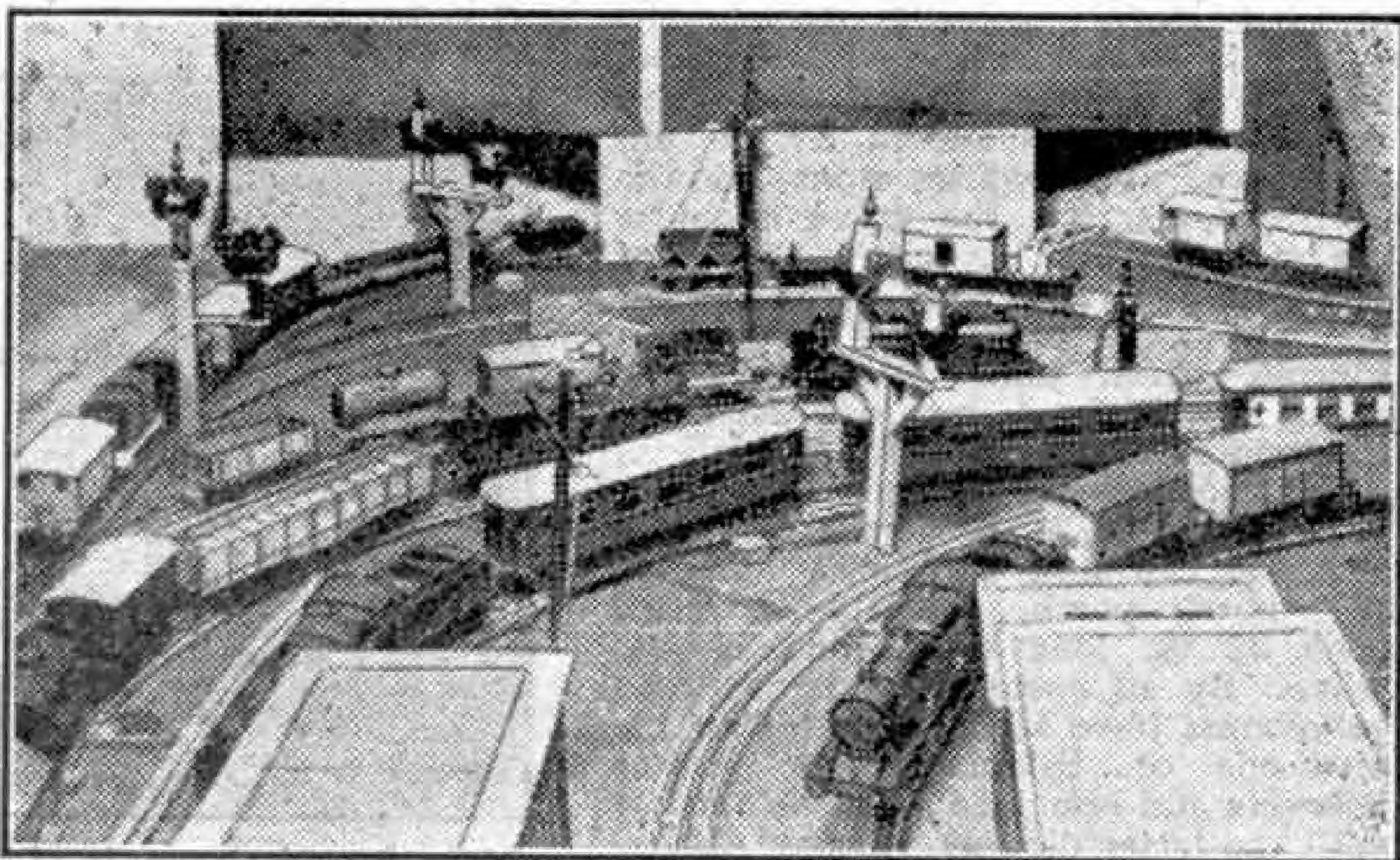
complete trains, each made up in standard formation according to its traffic. The principal express working represents the L.M.S. "Royal Scot," and the usual engine is a Hornby No. E320 Locomotive in L.M.S. colours. An express freight train is often taken by an L.M.S. Standard Compound of the Hornby No.

E220 Special series. Mixed goods trains, of which there are two, and a local passenger "set," are usually worked by an E220 Special Tank. Working to a timetable is the rule, and after completion of any particular set of workings engines return to the shed or locomotive yard and are then manoeuvred into position ready for the next working cycle.

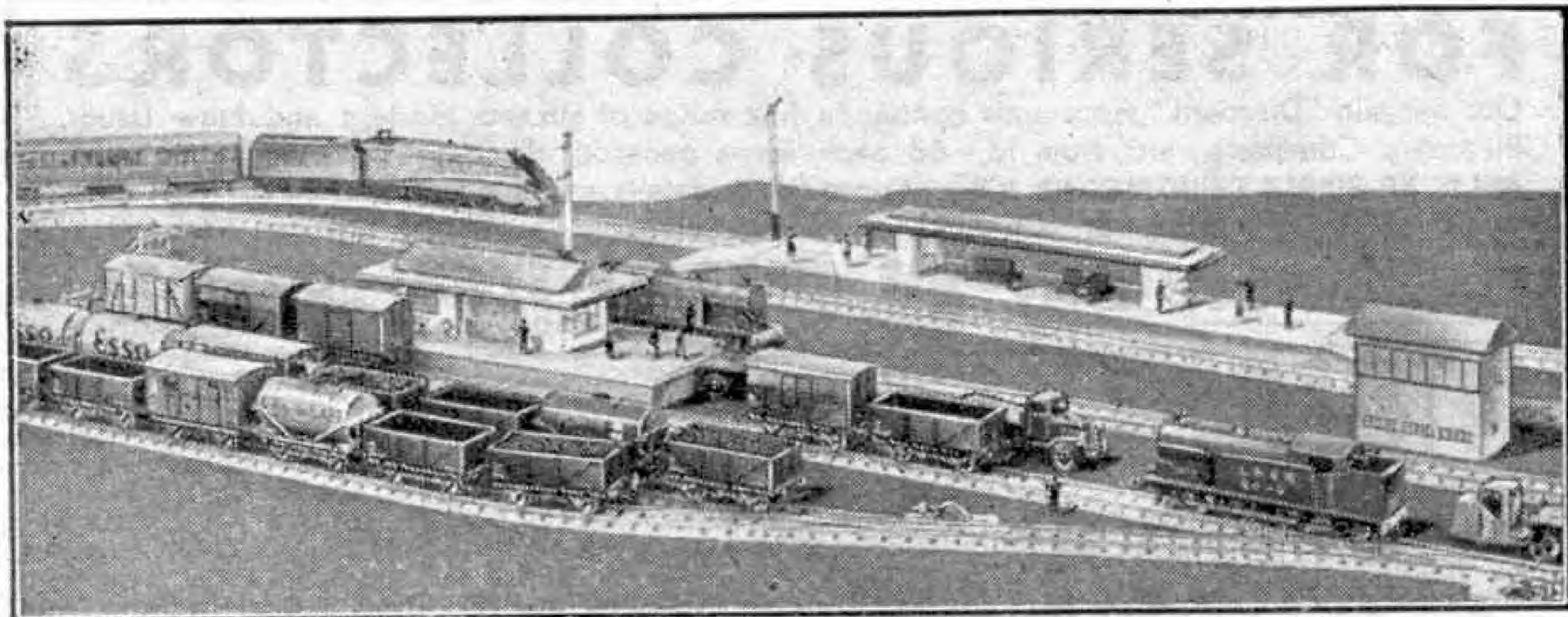
Power comes from alternating current mains through Meccano transformers. The layout is divided into 12 sections, each of which can be controlled separately; a train can be stopped in any one section while movements are being made with other trains elsewhere on the line. Home-built colour light signals are employed, and the switches for these, together with the isolating switches for the separate sections, are located on a control panel. In addition there are indicator lights on the panel which show when the sections are occupied.

Similarly the points which have been adapted for mechanical operation are wired up to a series of "tell-tale" lights located above the corresponding points levers, so that if any of the points are fouled during the movement of the lever the "tell-tale" light indicates this to the operator. The light signals have corresponding repeater lamps on the control panel too; thus the aspect of any particular signal is repeated on the control panel for the information of the operator. Another useful refinement is the use of "tell-tale" lights on the panel connected to the Circuit Breakers. If a short circuit occurs and a Circuit Breaker is tripped, the indicator light in question shows which Circuit Breaker and therefore which section of track is involved.

All buildings are illuminated and the goods and engine sheds are floodlit. The lighting installation can be dimmed or switched off entirely at a moment's notice. In connection with this there is a system of air raid warning sound effects from gramophone records.



An aerial view showing some of the colour light signals that are used so effectively on this layout.



Shunting operations in progress in the goods yard on a Dublo Layout. In the background is the Island Platform with a main line train approaching it.

Brightening Up Your Hornby-Dublo Railway

THE average Hornby-Dublo railway owner to-day finds himself in difficulty owing to the absence of new material for renewals and repairs. Happily we may now hope that things will soon improve. In the meantime let us see what can be done with our Dublo equipment in order to improve things generally and at all events keep the wheels turning.

We will deal first with electrically-operated locomotives. To get down to the job properly we should begin by removing the motor unit from the body of the engine. To begin with, accumulated dust and dirt and fluff should be removed. A small fairly stiff paint brush or an old tooth brush moistened with paraffin will do nicely, and a rag is handy to wipe oil from wheel treads and axles. Fluffy dust on these can be dealt with by means of a pin.

A dry wipe round the wheel treads will remove all but the most obstinate patches of the mud that collects on them. Any spots that prove difficult can be scraped with the head of our pin. The collector shoes also should be wiped clean, and we must see that they pivot freely under the action of the springs with which they are fitted. Any distortion of the channel-shaped piece of metal that holds them in position should be corrected. Most likely the commutator on the armature shaft will be dirty. If so we must wipe it clean and also the brushes that bear upon it.

The mechanism of a Dublo clockwork engine probably will not require anything more than a good clean. If it is dirty, put it in a small tin in which it can stand upright, and pour through the works a small quantity of paraffin. If it is extremely dirty, stand it in the tin as before and give it a good brushing through with a small mop paint brush charged with paraffin. However the cleaning job is done we should do it out of doors, or at least well away from any fire or flame. When the heavier part of the dirt has been washed out, dry the mechanism as much as possible and then set it aside to drain out and dry completely.

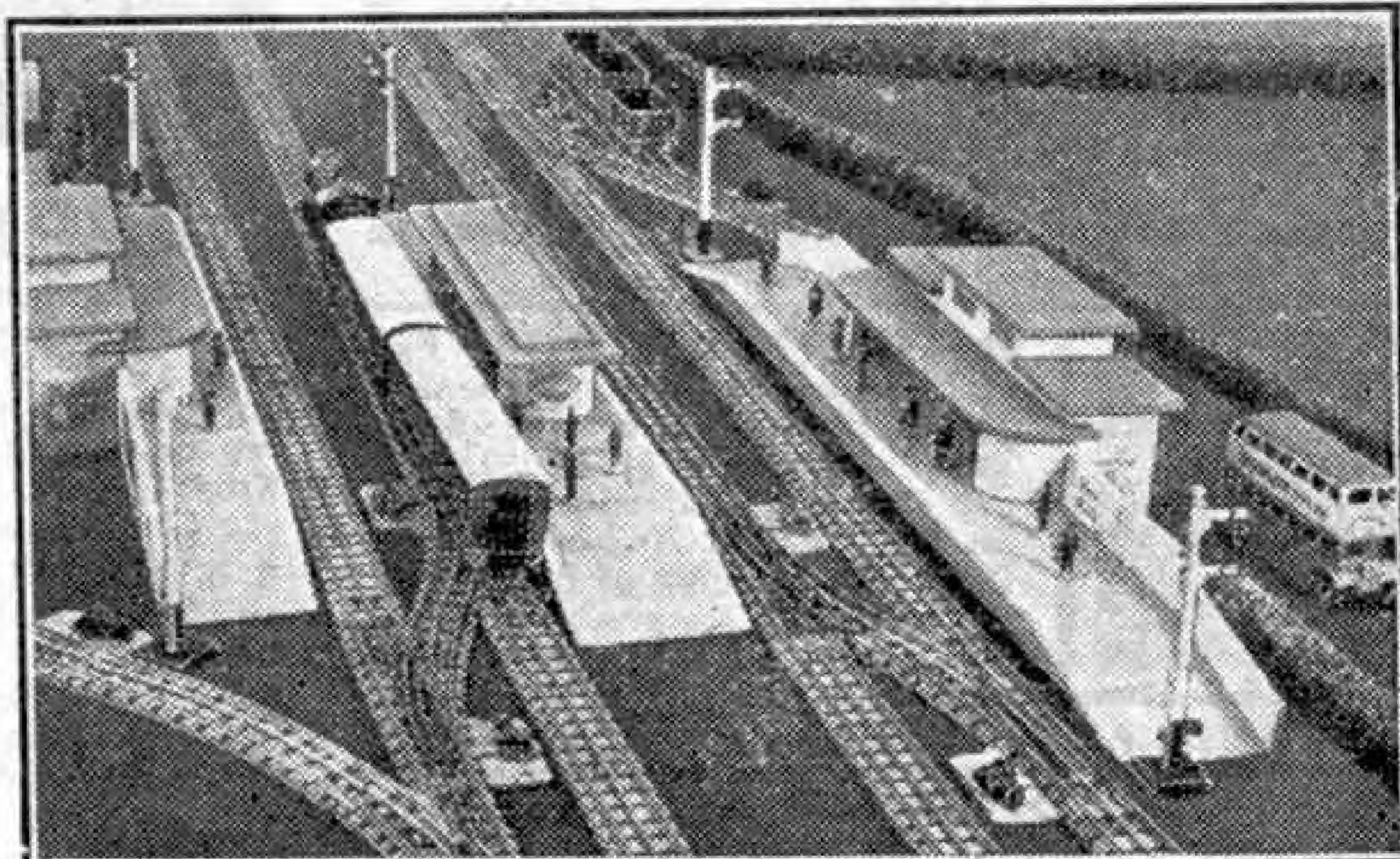
Before the electric or clockwork unit is used again it should be lubricated very sparingly. In the absence of actual Dublo oil, sewing machine or typewriter oil will do

quite well. On no account use any oil that is the least bit "gummy." The oil should always be applied with a small wire dipper, never with an oil can. The great point is to provide a thin film of oil, with no excess anywhere.

With tenders and rolling stock similar methods apply, though as a rule it is unnecessary to use paraffin. Our brush, rag and pin will usually do all that is required to remove any material that makes for sluggish running.

Finally steps are taken to see that none of the little axle-holding frames or trunnions are bent inward or that they prevent the wheels from turning freely. If they are we can adjust them without difficulty. A penknife is useful here. After cleaning and adjustment the axles should be oiled, but very sparingly. Automatic couplings too may require attention. If they are bent up or down so that they cannot engage properly, we must adjust them with a pair of pliers.

Clean track is important, but as a rule a good wiping over will clean the rails satisfactorily. Fish plates at the rail ends and the centre connecting clips may require adjustment with pliers but gentle treatment is essential. Switchblades at points may need a little setting but this should preferably be done with finger and thumb.



Two Main Line Stations and an Island Platform make up this four-track station. A "Local" is just leaving from No. 2 Platform.

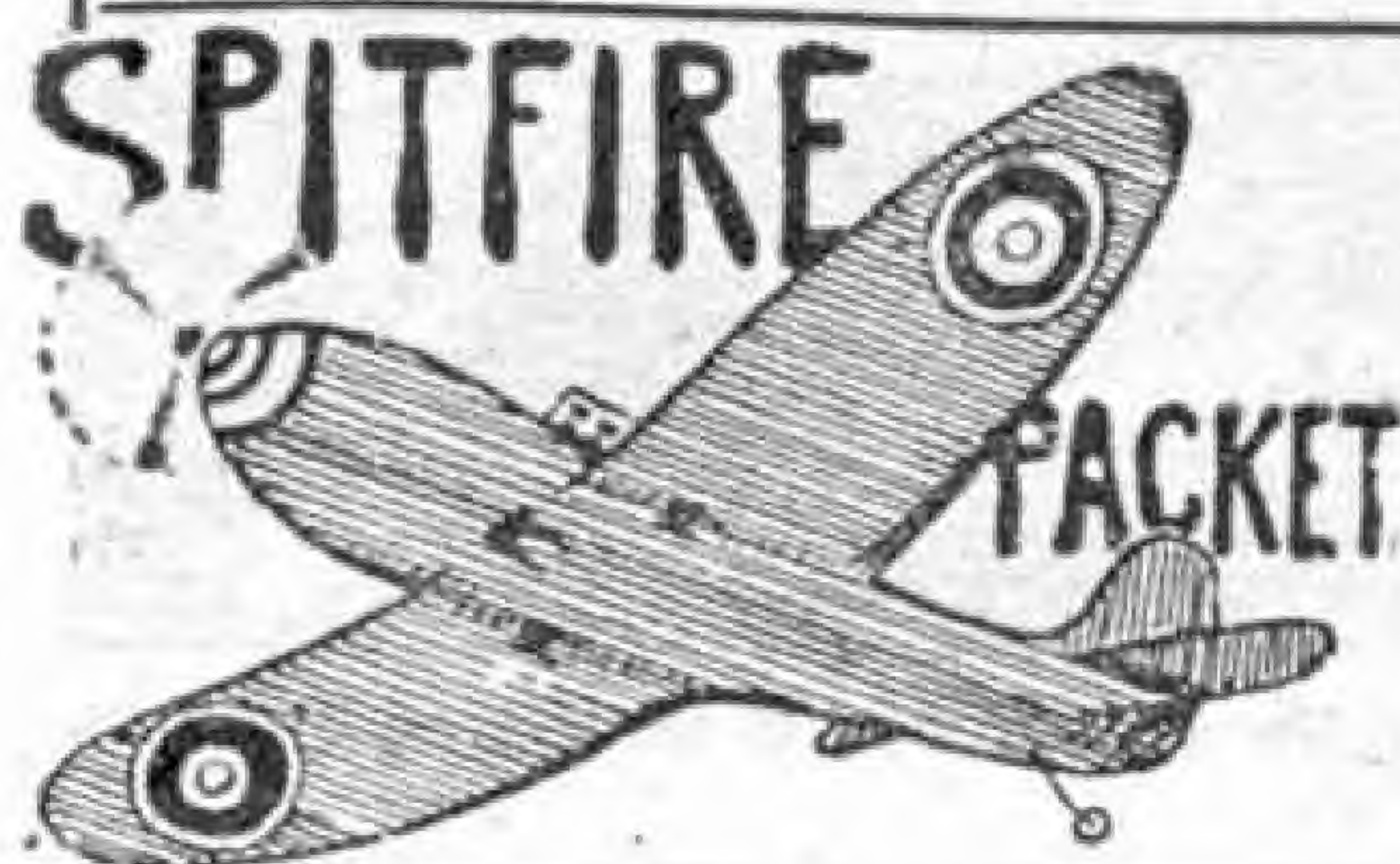
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1944 N.Z. HEALTH PKT.

(a) New Zealand 1944 Health Issue 1d. & ½d. (Just received).

(b) 2 Belgian Congo. (c) Roumania 1921 25b. Charity pict. (d) Travancore 1939 Maharajah's Birthday large pict. Send for this **NEW YEAR GIFT** enclosing 3d. stamp and ask for a Globe-Trotter approval selection.

Globe-Trotter approval selection.
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This beautiful stamp just issued by CURACAO depicts Queen Wilhelmina of the Netherlands, her Daughter and Husband, and the Royal Children. Three Generations on one stamp. It is included in this excellent packet of all different stamps from British Colonies, unused issues, U.S.A., old French, Australia (K.G. VI), Bohemia, and many others which space does not

permit us to mention. Finally a rare Great Britain 100 years old. Just send 3d. postage and request our famous approvals. If new illustrated Catalogue and Price List required, add a further 1d.

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Write to-day for British Colonial Approvals 1d.—6d. single items, also Coronations and short mint sets. Postage 2½d. Purcell, 22, Green Lane, Amersham, Bucks.

For other Stamp Advertisements see also pages 32 and viii.

Stamp Collecting

Ceylon on Stamps

By F. Riley, B.Sc.

FROM India, our last place of call in our Empire stamp tour, it is but a step to Ceylon, which is always associated in our minds with palms, spices and soft breezes. The island is certainly wonderful, with a climate better than that of many Eastern places, and the high ground in the interior, sea breezes and an abundant rainfall help to make it cooler and more pleasant than India, although it is nearer the Equator.



In recent years Ceylon has become well known to stamp collectors because of its splendid series of pictorial stamps. For a long time the stamp story of the island followed the usual lines of colonial possessions,

portrait stamps of the reigning British monarch being the rule. These are of the greatest interest to the specialist, who always speaks of the earliest, from 1857 to the issue of 1872, as "Pence Ceylons," as their values were in British coinage. The change to cents was made in 1872, and rupee values appeared later. In general "Pence Ceylons" are too highly priced for the average collector. For instance, the 4d. red of 1857, in the unused state, in the latest Gibbons "Simplified" is quoted at £675!

Portrait stamps continued right through the reigns of Queen Victoria and Edward VII into that of George V and the later examples are reasonable in price, so that a representative collection can be made by the collector of limited means. One of these stamps is illustrated on this page. It is the 6 c. value of the issue of 1903, one of five different portrait designs.

We can safely leave the earlier portraits with this, and come now to the pictorials of comparatively recent years, which certainly show us Ceylon on stamps. The first pictorial was the Silver Jubilee issue, but the picture on this had nothing to do with Ceylon, for it was the Windsor Castle view so well known to collectors of "Colonials." The first pictorial series in which we are specially interested therefore is the one of which the issue began in May of the Silver Jubilee year. This comprised 11 values, each with a picture that is at once attractive and typically Ceylonese. All were in two colours, the portrait of King George V and the frame being in one colour and the picture itself in another. The 15 c. value,



illustrated here, depicts a river scene in the island, with a stream flowing placidly between well-wooded banks, mountains in the background, and a cluster of

boats on the river.

Ceylon is one of the homes of the palm tree and it is not surprising therefore to find a coconut palm figuring on the 5 c. stamp in this issue. The 3 c. is more particularly Ceylonese, for it shows the famous mountain of the island, Adam's Peak, an imposingly regular cone. To the Ceylonese, whatever their race or religion, this is more than a mountain, for on it is a footprint claimed by the Buddhists, who form the greater part of the population, to be that of Buddha himself.

The print is six feet in length and is protected by a wooden pavilion open at the sides to the four winds. Other claims are made by Mohammedans and Hindus. But all are agreed that the print is a holy one, and it is revered by millions beyond those who climb the 7,360 ft. of the mountain in pilgrimage. Ceylon is a land of famous temples and relics, and the 25 c. value of this issue illustrates another of these, the Temple of the Tooth at Candy. The tooth is that of Buddha, and its Temple is perhaps the chief place of pilgrimage in the island.

Other scenes that are to be found on the stamps of this fine pictorial issue show a rubber plantation, rice fields, irrigation tanks and wild elephants, and there are also fine views of the harbour at Colombo, the capital, and of Trincomalee, a port that has come into prominence during the present war as a base for the British Naval and Air Forces.

The 1935 set was succeeded by the Coronation issue of 1937, with the well-known design used for so many colonial issues, and in 1938 came a further series of pictorials, with the portrait of George VI. Most of the stamps in this issue more or less repeated 1935 designs, but two new ones were introduced.

One of these shows the famous Sigiriya or Lion Rock, the name of which is an indication of its appearance. It is seen on the 10 c. value, and it is interesting to associate

the feature with the former rulers of Ceylon, more than 2,200 years ago, who were said to have descended from a lion. The name of the Royal House was Sehala, which means lion, and that of the island itself is a corruption of this.

The second of the new designs shows an ancient guard stone at Anuradha Pura, a gem of Singhalese sculpture. The guard stone was part of the so-called elephant stables at Anuradha Pura, which was the capital of the country for over a thousand years, and similar stones are often found at the entrances of ancient Temples and palaces.

It is impossible in a short article to do justice to all these designs, but sufficient has been said to indicate the interest of the stamps of Ceylon.





EGYPT & U.S.A. FREE

WONDERFUL SPECIAL OFFER. The Windsor Stamp Co. offer to you **ABSOLUTELY FREE** this large pictorial stamp of **EGYPT**, which is catalogued value 6d., depicting King Farouk and the famous Egyptian Pyramids, **AND IN ADDITION**, a set of **U.S.A. War Commemorative** stamps, which are catalogued value 9d. The set of American stamps depict the Statue of Liberty, 90-mm. Anti-Aircraft Gun and the Torch of Enlightenment. This wonderful packet of fine interesting pictorial stamps has a catalogue value of 1/3, but **YOU** can get it from the Windsor Stamp Co. **ABSOLUTELY FREE** by writing for Approvals and Price List, and enclosing 3d. in stamps for their postage expenses. Don't forget to write your name and full address very clearly. Write now.

THE WINDSOR STAMP CO. (Dept. M), UCKFIELD, Sussex

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2d. ea.: 8, 9, 10, 11, 19, 20, 21, 22, 23, 24, 25, 26, 94*, 95*, 99*, 112*, 113*, 137, 143, 145, 157, 160, 161, 181, 183, 201, 202, 204, 219, 221, 222, 223, 235, 236, 252, 253, 256, 264, 273, 278, 285, N6, N7, N8, N19*, N20*, N23, D5, D6, D8, D9, D16, D19, D20, D26, D27, D30, D34, D36, D47, D48, D52, D54, D59, D60, D61, D62, D63, D64.

3d. ea.: 12, 29*, 30*, 31*, 32*, 33*, 34*, 132, 158, 163, 182, 197, 200, 205, 212, 230, 267, 268, 271, 275, 276, 284, 323, N14, N24, D12, D44, D65, D66.

4d. ea.: 27, 159, 184, 254, 255, 257, 258, 259, 288.

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1/- ea.: 105*, 106*, 118*, 224, 263, 304, 316.

1/6 ea.: 88*, 90*, 301*. 2/6 ea.: 101*, 302*. 6/- ea.: 110*, 7/6 ea.: 89*.

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MONTHLY BULLETIN OF BRITISH COLONIALS

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For other Stamp Advertisements see also pages 30 and viii.

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The Stamp Shop, 5b, High Street, Conway, N. Wales

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ECUADOR. 1908, 25th Railway Anniversary, comp. ex. 5c. An attractive Waterlow printed set, showing a "Railway Engine," four triangulars and pictorial, cat. 5/6. Bargain price 2/6.

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COX, 17, STONELEIGH PARK ROAD, EWELL

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

AS promised last month, we are illustrating in this issue one of the four values of the "Al Bu Said" commemorative set of Zanzibar. Perhaps too much was expected in view of the fine commemorative set issued by this country in 1936, but to say the least of it, these latest stamps fall very far short, in

both colouring and design, of their predecessors; yet they are proving quite popular, and as they will only be current for a year—or less if the printing runs out—they should prove well worth the modest sum they are costing to-day.

By the time these lines are being read, the over-printed set of Indian stamps issued in connection with the same event as the new Zanzibar



stamps should be on sale in Great Britain. Though they will be very desirable used, most collectors will have to be content with a mint set, as they will only be valid for postage in Oman, the Arabian territory on the west of the Persian Gulf. Mint or used, the set is likely to prove scarce in time, as they will be on sale for only six weeks.

Some readers may be wondering who this Al Bu Said is; we were ourselves until we looked it up. While there is no desire to inflict on anybody a lesson in history, for those interested it can be stated briefly that the gentleman in question, early in the eighteenth century, defeated the Persians who had invaded Southern Arabia. He then became the ruler of Oman, of which country Muscat is the capital, and later sent a force to garrison Zanzibar, thus bringing to the two territories a peace which has endured, more or less, ever since. The present Sultan of Zanzibar is a descendant of Al Bu Said. Hitherto Muscat has used the ordinary postage stamp of India, and there is no news yet that these new "overprints" presage special stamps for Oman in future.

Lack of space last month prevented mention of the new set of stamps for Nyasaland, which should appear within the next few months. There seems to be a Colonial Office rule—would that the Whitehall mandarins attended to the big things with the same enthusiasm as they do the trivial—that colonies must only have an entirely new set of stamps every 10 years. As Nyasaland did not change their design when King George VI ascended the throne this colony's decade is now up; hence the new set. This will be entirely pictorial, and should prove very popular. Details of the designs selected will be given later.



little stamp which has just been issued by Argentina and is illustrated here. The stamp in question commemorates the 20th anniversary of the foundation of the Post Office Savings Bank there. No doubt the publicity derived from this stamp will be substantial, as usual. It has often been thought that most of the costly ballyhoo—there being no need really to make jobs in wartime—in connection with British "Wings for Victory" and similar campaigns could have been dispensed with, without the slightest loss, had an attractive stamp been issued on each occasion.

It is a short step from Argentina to Uruguay, and we are able to illustrate another stamp which has been issued to commemorate the centenary of the "Y.M.C.A." This is the second country in South America to thus honour this institution—it will be remembered that Brazil was the other—

and the issues show how much its work is appreciated in those parts.

Our last illustration this month is the forerunner of a new set for Egypt. The first stamp to appear is the olive 17 m. and the design is noteworthy for the fact that apparently the King of Egypt, as depicted on his stamps, has aged as much in a few years as did Queen Victoria in as many decades.

There is another set, of four values, to hand from the Dominican Republic. These have been emitted—amongst other things—to help the "Red Cross." A new American commemorative, the latest U.S.A. stamp, has something to do with the moving picture industry, but whereas the design is not bad the object seems pretty weak.

As many collectors spend more on their hobby than they can afford to throw away, they are naturally

interested in a bargain now and again. There can be no harm in that, providing they don't buy stamps just to make profit. If they do, well they are simply not collectors, and it is not for these that it is proposed to mention occasionally stamps that are worth more than their catalogue quotation suggests. Here's one. The 1d. Grenada, present issue, perforated $12\frac{1}{2} \times 13\frac{1}{2}$, is priced by Gibbons at 4d. It is worth many times that sum.



World's Most Beautiful Capital—*(Continued from page 3)*

artist's dream. The bay itself is cut off from the open sea by the rocky mass that juts out to narrow the opening to the bay, and through this a large tunnel has been driven that gives access to even more wonderful beaches on the open Atlantic shore. In recent years these have been wonderfully developed as playgrounds of unequalled beauty. The most famous is Copacabana, the pride of Rio de Janeiro, a magnificent stretch of white sand four miles long, where every day thousands of bathers enjoy gambols in the surf, or bask on the beach itself under colourful parasols.

**SIXTY YEARS OF
ENGINEERING PROGRESS**

An illustrated booklet that has just been issued by Rubery, Owen and Co. Ltd., Darlaston, is a fine record of 60 years of engineering activity. The firm was founded by two brothers, J. T. and T. W. Rubery, in a modest factory, where they settled down to the manufacture of light steel constructions. The entire works of that time occupied only about a third of the site now covered by the great structural shop alone, and it is certain that the brothers had little idea of the immense growth awaiting the company. This was due in great measure to the energy and ability of Mr. A. E. Owen, who became a partner in 1893.

Mr. Owen was one of the first to realise the value of pressed units in the construction of motor cars, and for many years chassis frames were the firm's principal product. Then metal aircraft components and motor car wheels were added. The structural steel business also expanded, and many large and important buildings in London, including Broadway House, Westminster, the tallest building in the city, were erected by them. Examples of the structural steel work of the firm indeed are scattered all over the country, and include the stands of many famous football clubs.

Mr. Owen died in 1929, and since that time the business has been carried on by his sons, who have not merely continued the rate of progress previously achieved, but have increased it. All departments have been expanded, and a new one has been established for machining armour and bullet-proof plates, while other firms have been absorbed or associated with the work of the company. Further expansion came with the outbreak of war, in which the products of the firm have played a great part in many different directions.

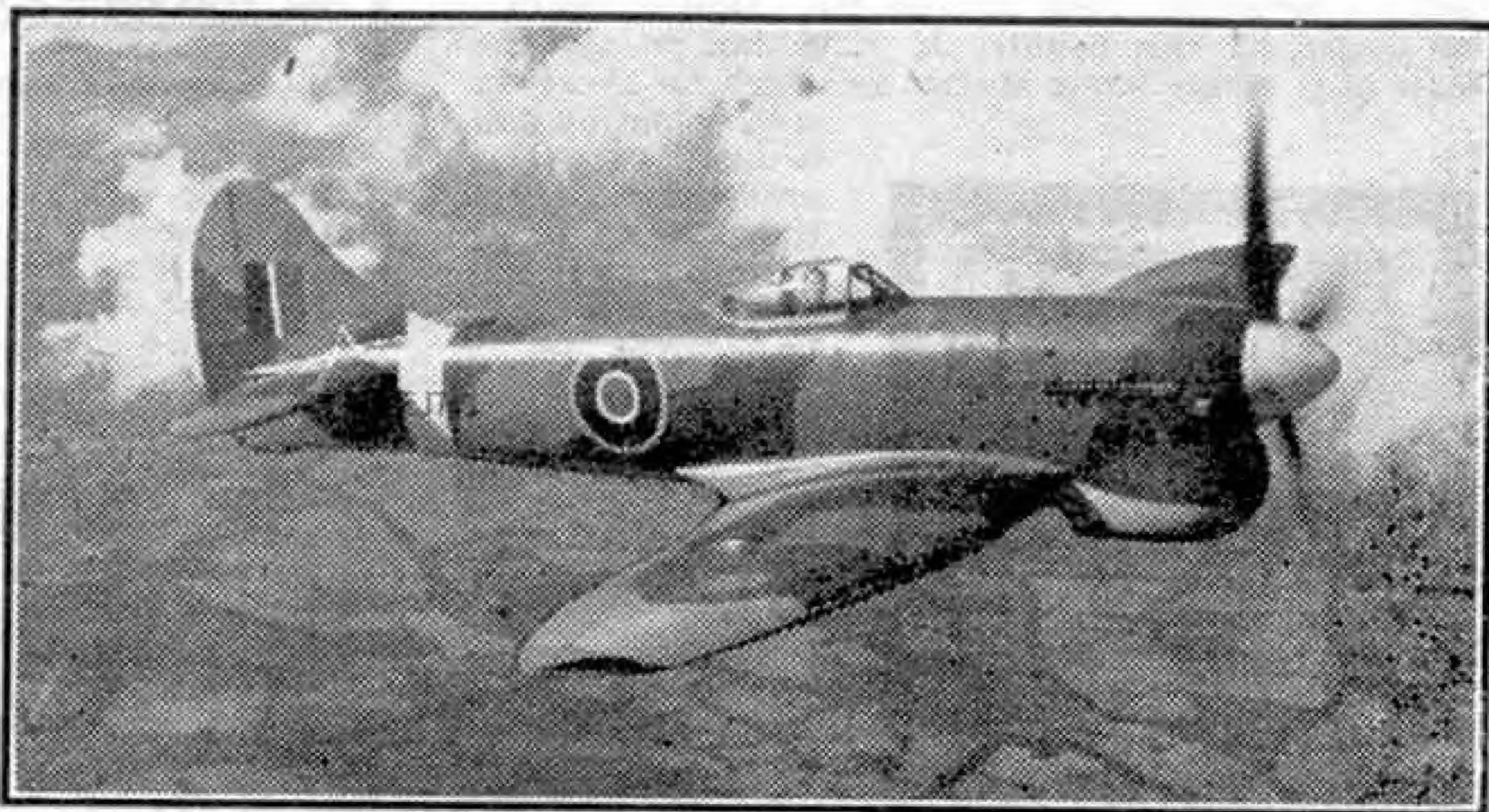
DON'T EXPERIMENT WITH EXPLOSIVES!

We have been asked to appeal to readers of the Magazine to co-operate in keeping within reasonable bounds a growing craze to concoct explosives. It is not unnatural that some boys should try to imitate in a small way the manufacture of bombs and other dangerous explosive missiles, but the results of their efforts may be disastrous. Cases of severe burns and eye injuries have been recorded in various parts of the country, one boy actually losing three fingers of one hand as the result of an explosion with chemicals with which he was experimenting. We are sure that all readers of the "M.M." will not only refrain from dangerous experiments of this kind, but will do their best to dissuade others.

COMPETITION RESULTS**HOME**

August "Photographic" Contest.—1st Prizes: Section A: W. Silvester, Bromley; Section B: J. M. Dyble, Liverpool 19. 2nd Prizes, Section A: F. G. Reynolds, Sidcup; Section B: D. Hamilton, Hove. Consolation Prizes: A. G. Jones, Prestatyn; B. Chulindra, Wadebridge.

September "Shunting Puzzle" Contest.—1st Prize: R. Butler, Bushey; 2nd Prize: R. H. Higgins, Birmingham; 3rd Prize: F. Mills, Kearsley. Consolation



The Hawker "Tempest," Britain's latest fighter. (See special article on this fine machine on page 13). Photograph by courtesy of Hawker Aircraft Ltd.

Prizes: D. Beard, Bushey; M. Sanders, Cardiff; J. P. Cecil, Gloucester; W. Casling, Leyland; P. Linfoot, Torquay.

September "Code Word Puzzle" Contest.—1st Prize: T. D. Tasker, Barnsley; 2nd Prize: K. N. Coppack, Chester; 3rd Prize: W. Quemby, Sutton. Consolation Prizes: T. Moody, Bristol 5; P. M. Hoskins, Bristol 3; G. I. Jones, Chertsey; M. H. L. Waters, Beckenham.

September "Photographic" Contest.—1st Prizes, Section A: B. Chulindra, Wadebridge; Section B: P. Sullivan, Bilston; 2nd Prizes, Section A: F. G. Reynolds, Sidcup; Section B: D. Forsythe, Blackrock. Consolation Prizes: R. E. Haddock, Chesham; H. C. Hoole, Sheffield 2; J. R. Faulkner, Fenton; W. A. Wilson, Birmingham 19; Miss R. Johnson, Dawlish.

OVERSEAS

January "1943 Cover Voting" Contest.—1st Prize: J. Old, Wellington; 2nd Prize: A. Benjamin, Germiston; 3rd Prize: J. G. Cherry, Pretoria. Consolation Prize: D. L. de Beer, Capetown.

January "Railway Quiz" Contest.—1st Prize: G. Hollis, M.E.F.; 2nd Prize: J. A. Markham, Windsor, Ontario; 3rd Prize: B. Simpson, Sydney.

February "Knight's Tour" Contest.—1st Prize: T. Wilson, Geelong; 2nd Prize: J. Old, Wellington; 3rd Prize: B. Shroff, Auckland. Consolation Prize: E. E. Williams, Wanganui.

February "Photographic" Contest.—1st Prizes, Section A: R. H. Downing, Melbourne; Section B: R. Smith, Toronto. 2nd Prizes, Section A: J. S. B. Taylor, Johannesburg; Section B: F. G. Simms, Vancouver.

"THE STORY OF THE WEST HIGHLAND"

The first printing of this booklet, published by the L.N.E.R., has been sold out, but it is hoped to have further copies printed. Readers of the "M.M." who wish to obtain a copy should write to The Press Relations Officer, London and North Eastern Railway, H.Q.1 (via Hitchin), enclosing a remittance to cover the cost of the booklet, 3/6, and postage.

Competitions! Open To All Readers

Which Were the Most Popular Covers in 1944?



January is the month in which we give readers the opportunity of telling us which of the previous year's covers they like best, and here is our 1944 Cover Voting Contest. The 12 covers concerned are reproduced in miniature above. These reproductions are not in colour, and so do not convey the brilliance of the originals.

All that is required from entrants in this contest is to state on a postcard: A, which cover he likes best; and B, what he thinks will be the order of popularity as decided by the votes of all competitors. The covers must be referred to by the names of the months in which they appeared, and it is not necessary that a

competitor's own favourite should be placed at the head of list B, which should represent his idea of popular opinion of the covers.

In this contest there will be the usual separate sections for Home and Overseas readers, with prizes of 21/-, 10/6 and 5/- respectively in each. In addition there will be consolation prizes for other good efforts. Competitors must remember to put their names and addresses on their postcards, which should be addressed: "1944 Cover Voting Contest, Meccano Magazine, Binns Road, Liverpool 13." The closing dates are Home Section, 28th February; Overseas Section, 31st August.

A Railway "Quiz"

Every reader of the Magazine who is interested in any way in railways will find this month's competition easy and attractive. It takes the form of a "Quiz." What is required from the entrant is to name railway features, that is locomotives, track or any other part of a railway system, indicated by the 15 clues given below. The answers required consist of one, two or three words, and to assist competitors we indicate the number of letters in each part of the solution, the dashes representing consonants and the crosses vowels.

Here are the clues:

1. Part of permanent way; - x - - - x - x -
2. Inside some coaches; - x x - x - x -
3. Some locomotives have these;
- - x - x - x - - x - - x - -
4. Others have these also; - x - x - x - - x - - x - -
5. Now part of the L.M.S.; - x - - x - - - x x - - x -
6. Seen between wagons; - x x - - x - -
7. A famous locomotive; - x - x - x - x x -
8. Famous for his "Pacifics"; - - x - - x -
9. The only British 4-6-2 of its kind;
- x - - x - x - x - x -
10. Used with the answer to No. 1; - x - - -
11. Inside a signal cabin; - x - x - - - x - x
12. Large terminal stations have one;
- x - - - x - - x -
13. Most British electric trains have these;
- x - - x - - x - - - x x -
14. Every steam locomotive has one; - x - x - x - x -

15. These coaches are not in use at present;
- x - - - x - - x - -

In both Home and Overseas sections of this contest prizes of 21/-, 10/6 and 5/- will be awarded for the best solutions in order of merit. In the event of a tie for any prize novelty of presentation will be taken into account. All entries should have the sender's name, address, and age marked on them.

Entries should be addressed "January Railway Quiz Contest, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section, 28th February, 1945; Overseas Section, 31st August, 1945.

January Photographic Contest

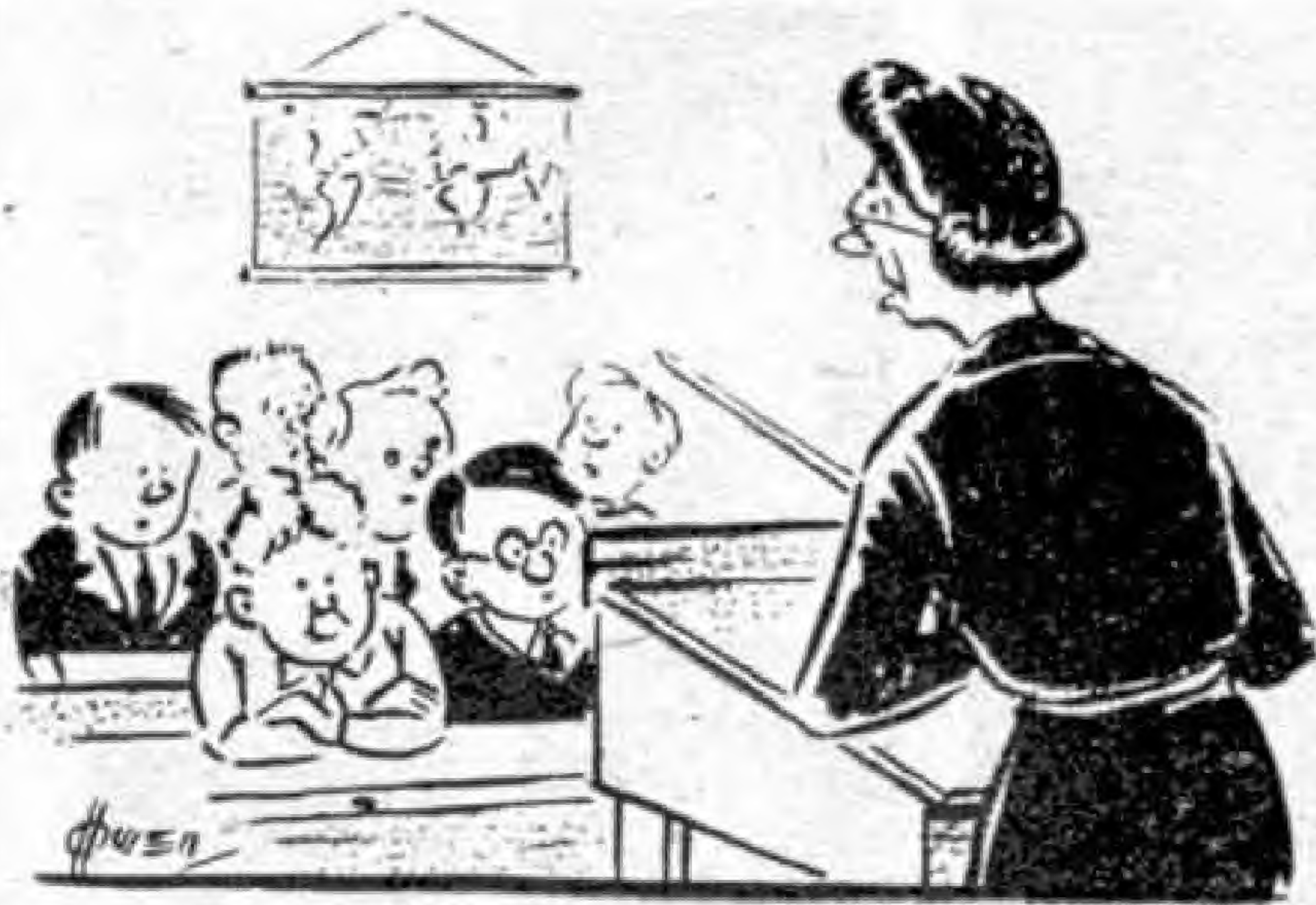
This month's photographic contest is the 1st of our 1945 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if the entrant desires.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: "January Photo. Contest, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for Overseas readers.

In each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home Section, 31st January; Overseas Section, 31st July.

Fireside Fun

"If there were four flies on the desk, Billy, and I killed one, how many would be left?"
 "One," replied Billy. "The dead one."



"What is a comet?"
 "A star with a tail."
 "Very good. Name one."
 "Mickey Mouse."

Visitor: "You don't mean to tell me that you have lived in this out-of-the-way place for more than 30 years?"

Local Citizen: "I have."

Visitor: "But, really, I cannot see what you can find here to keep you busy."

Local Citizen: "Neither can I—that's why I like it."

"Right Turn! About Turn! Halt! Quick March," barked the alert sergeant, drilling a squad of recruits. And so it went on, until at last a Yorkshireman became very indignant.

"'Ere, I've 'ad enough o' this," he exclaimed in disgust. "Tha' doesn't know thi awn mind two minutes together."

"Halt! Who goes there?"

"Army Chaplain."

"Advance, Charlie Chaplin, to be recognised, and don't be so dashed funny next time."

THIS MONTH'S HOWLER

Doctors say that fatal diseases are the worst.



"What is it about a dachshund you don't care for?"
 "They make such a draught when they come in the room. They keep the door open so long."

BRAIN TEASERS

STOP THIS ONE

Here is a queer sentence that doesn't make sense. "The wagons are the train at Weybridge." All that is required to put reason into these words is the addition of two full stops. Can you put them in correctly?
 A.J.D.

WHY DO THEY EAT IT OUTDOORS?

A reader of the Magazine was so amused by the escapade of Aunt Maria given on this page in the September 1944 "M.M." that he tried to make up a similar problem. The resulting confusion was: "Cowscathayforfunindoors." This is not as exciting as the mad aunt's feat, but provides an interesting puzzle. What places were named on the labels of which the remains showed this remarkable combination?

For the benefit of new readers we should explain that the labels on a much-travelled suitcase are supposed to have been torn at one end or both, so that only fragments remained. Each fragment represents a station in Great Britain.

EASY IF YOU KNOW HOW

Here is an interesting division sum, devised by J. Haynes, of the Thebarton (South Australia) M.C. JANS)SONEEEEED(LNFO SONFS

OLEE
 JANS

DFELD
 DFAFJ

DJH

Every letter in this collection represents a definite number, between 0—9, and the puzzle is to find the numbers that will fit.

SOLUTIONS TO LAST MONTH'S PUZZLES

1	15	5	12
8	10	4	9
11	6	16	2
14	3	13	7

1	11	6	16
8	14	3	9
15	5	12	2
10	4	13	7

The first diagram reproduced above shows how the square in our first puzzle last month should be cut up, and the second illustrates how the parts are re-arranged to form a magic square.

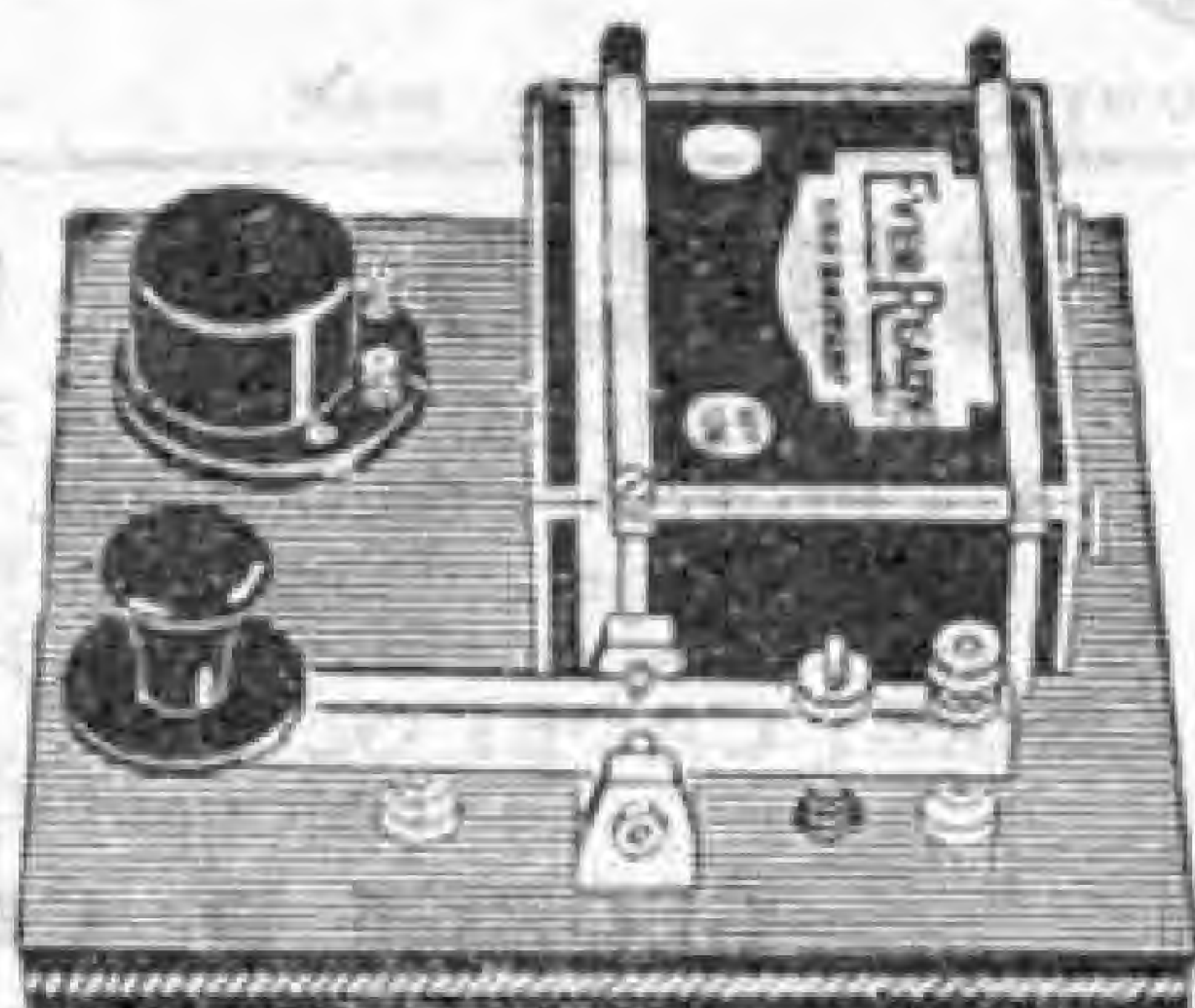
Our second problem is one of the type that is easily solved by the algebra experts, but there is a quicker way of finding the answer. This is to note how 1,050 can be divided. On trying various numbers from 2 upward we soon see that it is divisible by 14 and 15, giving quotients of 75 and 70 respectively. These figures obviously provide the solution. Mr. Thoroughbred bought 14 horses and paid £75 each for them. If he had waited he could have bought 15 horses at £70 each.

The encyclopædia puzzle presents an old but neat trick. With the volumes on the shelves the opening page of each is on the right and the concluding page on the left. Thus the distance between the beginning and end of the encyclopædia is the thickness of the 24 volumes placed between the first and last, or 6 ft.

In our last puzzle the shop assistant should have written £6/13 on the price ticket, but instead he wrote £13/6.

There only remains the deliberate mistake. This was in the heading of the third Brain Teaser, where the worm was described as leaning, not learning.

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The binding cases are supplied so that readers can have their Magazines bound locally, but where desired the firm mentioned above will bind the twelve issues of the 1944 "Meccano Magazine" at a charge of 10/6, including the cost of the binding and also return carriage. The covers of the Magazines may be included or omitted, as required.

These prices apply also to the volumes for 1942 and 1943.

Binding cases for the larger size of the "M.M." prior to 1942 are still available, price 7/3 for 12 issues. The complete cost of binding this issue is 10/6 for 12 copies.

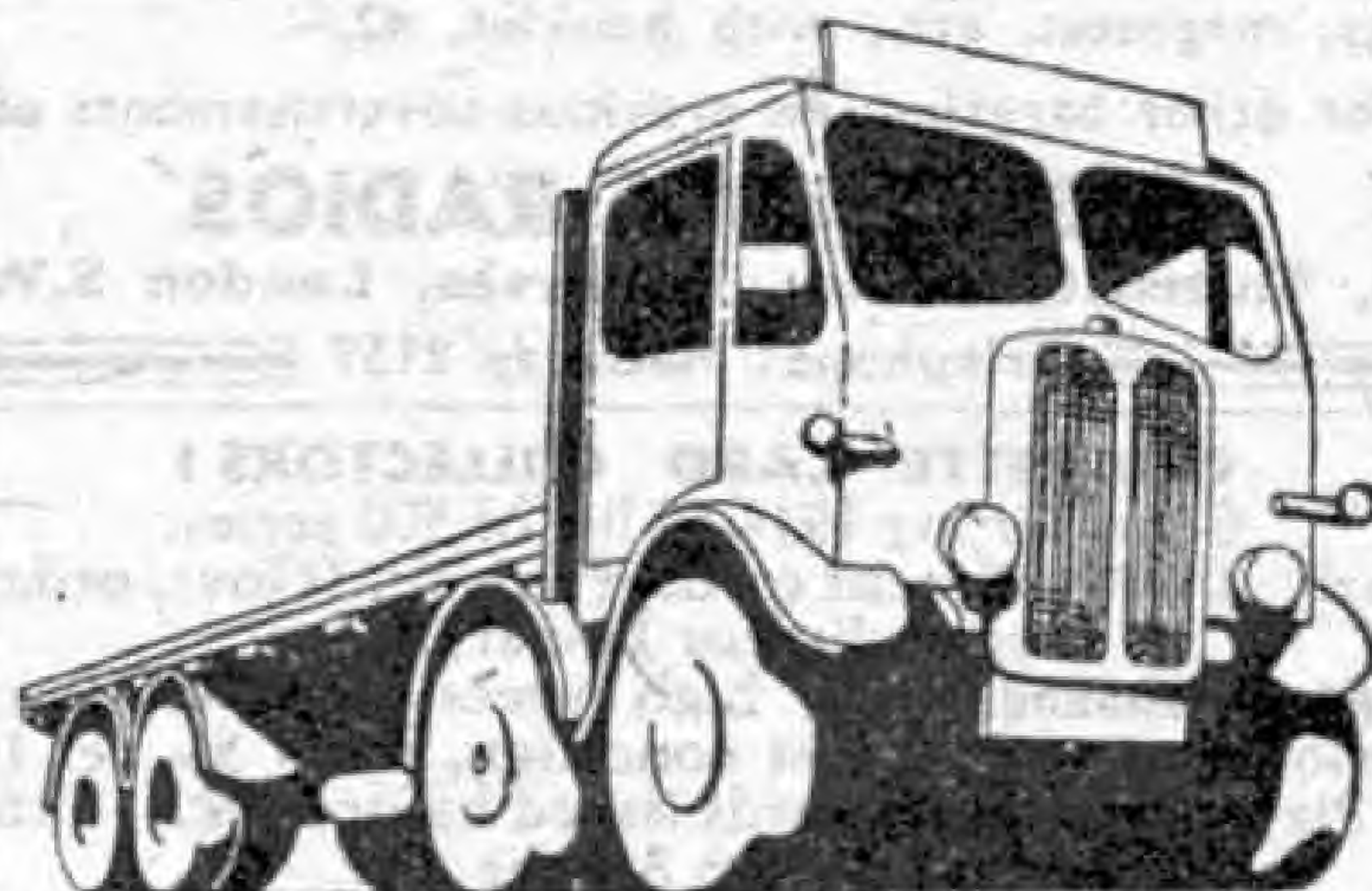
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(See also pages 30 and 32)

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